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C1Po1E-02: Preparing the Cryogenic Moderator System (CMS) at SNS for higher beam power

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The Spallation Neutron Source (SNS) incorporates a 20-K helium refrigeration system to cool three circuits supplying cold hydrogen to neutron moderators. The helium refrigeration system consists of a warm compressor, oil removal, purifier, 20-K cold box, and three helium-hydrogen heat exchangers. The hydrogen loops consist of a circulator, moderator, accumulator with expandable bellows, and the heat exchangers. Historically, the cryogenic system has had periods of instability and has operated with a reduced capacity. While performing the Proton Power Upgrade, the proton beam power on the first target station will increase from 1.4 MW to 2 MW. This will result in a 43% increase in dynamic load to the cryogenic system. The first directive in preparing the system for higher beam power was to achieve consistent operational stability at 1.4 MW beam power. After this was achieved, the next task was to increase the system capacity. This paper will describe the initiatives taken to produce consistent high-capacity performance.

Author: HOWELL, Matthew (Oak Ridge National Laboratory)

Co-authors: DEGRAFF, Brian (Oak Ridge National Laboratory); Mr DENISON, John (Oak Ridge National Laboratory); Mr ARMSTRONG, Rocky (Oak Ridge National Laboratory); MAEKAWA, Ryuji (Oak Ridge National Laboratory); FABRE, Yannick (Air Liquide)

Presenter: HOWELL, Matthew (Oak Ridge National Laboratory)

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