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Refrigeration Recovery for Experimental Hall High Target Loads

Wednesday 24 September 2008 10:30 (25 minutes)

The End Station Refrigerator (ESR) at Jefferson Lab (JLab) supports three experimental halls. The refrigerator for the ESR, a CTI 1500 W 4.5-K refrigerator designed in the late 1970's, is capable of supporting a 1250 W target load at 15 K (simultaneously with a 1100 W 4.5-K refrigeration load). This plant has been routinely supporting 15-K target loads, as well as 4.5-K magnet loads, since 1994. In the summer of 2004, a single use, two week run duration, high powered target load required some low cost modifications to ESR in order to allow the target to be directly supplied with super-critical 4.5-K helium from JLab's Central Helium Liquefier (CHL). However, after the installation of these modifications, which included an air ambient vaporizer, there has been a consistent usage of this capability for the same sized target loads and a demand for an even higher target load by the planned Qweak experiment in mid 2009. In the Fall of 2004, after it was apparent that this capability was now routinely being sought, a method of integrating refrigeration recovery with the existing refrigerator was proposed. In April 2008, funding was given to execute the project. After completing the process studies, the mechanical design is now underway. The purpose of the modification is to recover the available refrigeration from the 20-K target return, resulting in reduced 4.5-K helium required from the CHL. In addition, these modifications are anticipated to result in an ESR input power reduction for present target loads and the capability to support the 2500 W 15 K Qweak target load.

Proposed for workshop session (see call for abstracts): 1- Operation 2- Maintenance 3 - Safety 4 - Control

Operation

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