Cryostat Studies

The first cryostat study was performed with nominal components in January of 2012. This study utilized a standard fill – the components were placed under a vacuum of approximately 7x10^-3 torr and baked to a temperature of approximately 330 K before being filled with argon to cool. It was found that the spike rate dropped significantly after the baking, giving a total of five spikes over the 120 hour run.

The components within the cryostat were then replaced with "C" components, which had been dried in a twenty-four hour vacuum and wetted by distilled water for twenty-four hours during construction. This study used a different fill procedure. On March 19, a short vacuum was run to 30 microns before a flush of argon gas to 1psi. A second short vacuum was run to 5.85x10^-3 torr before a second flush of argon gas to 1 psi. Finally, the cryostat was pumped down to 4.45x10^-3 torr and filled with liquid argon, which was completed on March 26. There were 105 spikes over the 215 hour run.

The third and final cryostat study also utilized the "C" components. On April 4, the heater within the cryostat was turned on and the components were baked over 68 hours. During this period there were 236 spikes. The heater was then turned off and the cryostat filled with argon, which was completed on April 16. There were eight triggers during the 198 hour run after the argon fill.

For each study, hourly spike and noise burst rates were found and graphed. The hourly spike rates for the three studies were then graphed together to compare the effects of the different procedures.

Baking the components while under a vacuum then filling the cryostat with liquid argon shows a significant reduction in the spike rate. One possibility, moisture and other contaminants absorbed by the HEC components while in storage are reduced or removed by the vacuum baking process.

In the future, the second and third studies will be repeated with the final set of components.