

**TO: Phil Heitzenroeder**  
**FROM: Michael Kalish**

**SUBJECT: Helium Bakeout System Close out Notes, WBS 6401**

*Date: 11/21/08*

### **Scope**

This job includes the design through to the completion of detailed drawings and the FDR for the Helium Bakeout System.

### **Status**

This job never advanced past some basic calculations, sizing studies and cost estimates.

### **Interfaces**

The Helium Bakeout System must interface with the tubing applied to the vacuum vessel. The impedance of the tubing which has been analyzed and tested drives the requirement for the Bakeout System design. The bakeout systems must be capable of pushing the required flow and density of helium through the existing tubes on the vacuum vessel to achieve the system requirements for temperature at time.

### **Specifications**

No specifications have been generated.

### **Schematics and PIDs**

N/A

### **Models**

No models have been generated

### **Drawings**

No drawings have been generated

### **Analyses**

Only initial sizing calculations were completed

### **Testing**

N/A

## **Costs**

Cost estimates for the Helium Bakeout System are in the job estimate and based upon a conceptual design, time and materials and component costs from quotes.

## **Remaining Work**

Various conceptual designs and cost estimates were prepared but all other work was pending at the time of the programs cancellation. It is likely that the job would start over from scratch if resurrected.

## **Lessons Learned:**

N/A

## **Conclusion:**

The conceptual design of the NCSX Bakeout system went through several iterations. It began as a pressurized helium bakeout system capable of heating the vacuum vessel to 350C and through several iterations necessary to reduce cost ended as a once through hot air system capable of heating the vessel to 150C. Any future work on the NCSX bakeout system would likely take a fresh look at new requirements and borrow ideas from previous scoping studies.