

## **PAC 2005 GROUNDING OF SNS ACCELERATOR STRUCTURE**

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### **GROUNDING REQUIREMENTS FOR THE SNS LINAC KLYSTRON GALLERY.**

The entire facility grounding consists of 100'x100' mat of 4/0Cu wire exothermically welded.

Each crossing is tied to a grounding rod. An additional grounding rod is added on building perimeter for lighting protection. (SNS grounding grid and FE\_)

The facility has enhanced (low impedance) RF grounding for the klystron building at each klystron station. Owing the fact that the building lay out has not finalized at the time of RF grounding being installed, the additional RF mat is terminated on the north wall of the klystron building to a grounding plate. (E7-01-02.PDF)

### **GROUNDING IMPROVEMENT**

The grounding improvement, as originally suggested by Bill Reass from LANL, has been consolidated after discussing the issue with Bill Reass and Dan Stout from LANL, Ray Fuja and Randall Wood from SNS/ORNL, Geoffrey Pile and Greg Markovich from APS and Edward Martin from JLAB.

Hence the grounding improvement for the klystron gallery shall be an additional low impedance grid made of 2/0 Cu cable arranged in five continuous runs along the klystron gallery with four to six cross ties connected to the gallery RF bus, located on the north wall close the klystron stations. The spacing of the long runs along the gallery shall be approximately one foot and located in the north half of the gallery, as close as practically possible to the gallery RF ground buss. This low impedance grid underneath the klystron gallery floor is then connected to the main grounding mat and the structural steel, concrete reinforcing steel included. This requirement complies with IEEE 142-1982 – Grounding of Industrial and commercial power systems.

### **ELECTRICAL DISTRIBUTION**

Electrical distribution is grounded and bonded to the 100'x100' mat.

2/0Cu wire is run with cable tray system and along the beam line for grounding and bonding of equipment.

In addition to 2/0 wire in the LINAC tunnel, grounding plates tied to the 100'x100' mat are embedded in the LINAC tunnel wall every 100'.

Single point ground for beam diagnostic is provided on the north wall of the klystron building.

Equipment racks, water carts, modulators, etc., have AC service grounded and bonding and grounding of enclosures is provided.

Raceways are bonded and grounded.

Shielded cables have the shields bonded and grounded at the equipment site (not at the beam line component side).

BNL requirement of three grounding breaks in the ring system separates HEBT, RTBT from RING Service Building and divides the ring tunnel in two sections to prevent beam induced objectionable currents.

This features rebar separation, cable tray separation, water piping separation by insulating spools, crane track separation and AC, DC, HV and instrumentation cable pulls observing these breaks.