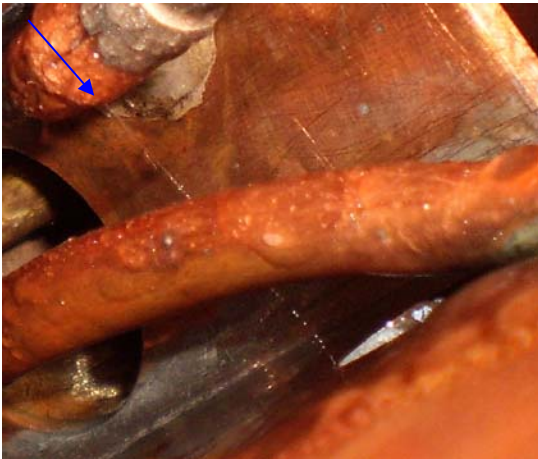


Repairing water leaks in the TR-19 cyclotron: A case study in what not to do. MJ Schueller, DJ Schlyer. Medical Department, Brookhaven National Laboratory, Upton, NY 11973, USA.

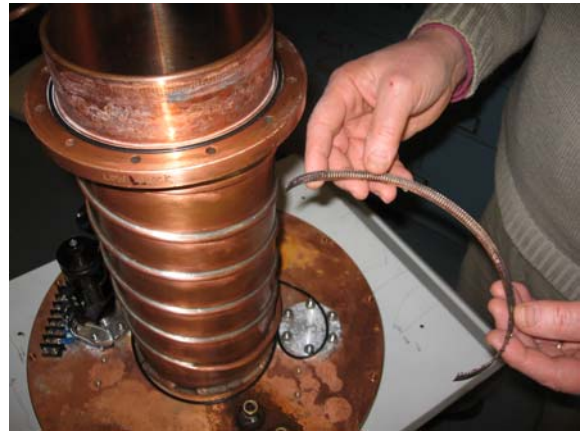
In early September, 2009, a water leak opened up in one of the dees of BNL's ACSI TR-19/9 cyclotron. Attempts to patch the leak in place failed, so the dee was removed, repaired and replaced. After a week of operation, a nearly identical leak opened in the other dee. This began a chain of failures in the cyclotron, leading to approximately 8 months of down time in the human PET program at BNL. Multiple water leaks, burned internal components, and two new dees later, the machine is back to running stably.

A time sequence of events will be presented, with cascading problems, and a discussion of what steps were taken and why, with a particular focus on in house repairs that "seemed like a good idea at the time."

Some highlights:



The first leak, in an elbow near the dee stem.



An attempt by BNL to replace burned fingerstock in situ failed. The cold solder joint held for a few weeks.



Fingerstock shouldn't look like this. When we opened the vacuum tank and smelled burned flux we knew we had a problem.

This issue was finally resolved with ACSI providing a replacement part with factory-soldered fingerstock.



The new lower dee was installed and aligned, then removed to replace the burned fingerstock. At some point, it became bent ~2mm at the dee tip. Made of 7mm copper, it did not bend back easily. The cause is unknown.