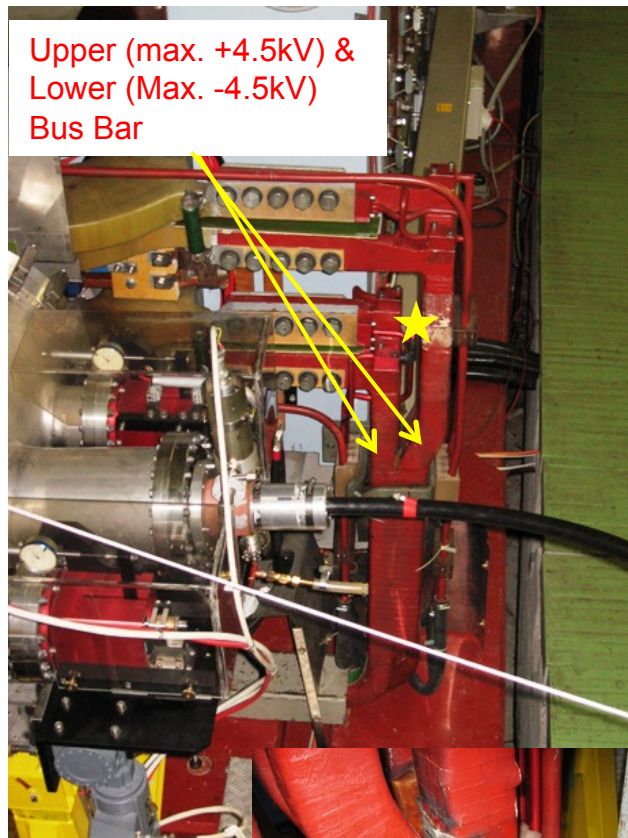


## TE-MS-C-MNC

### PS Ring, Unit 22 – 23 Bus Bar Insulation Break Down



- 3<sup>rd</sup> – 4<sup>th</sup> September 2009, the magnet piquet service was called to help investigate a problem with the PS main magnet circuit.
- The main generator had tripped with an irregular function detected by the new control system, no problem could be found with the control system.
- A high voltage test on the magnet circuit revealed a short circuit to ground for the lower coils of the main magnets (below the threshold of the ground fault detection circuit).
- By sectioning the machine the problem was identified as a short to ground for the bus bar between main units 22 and 23.
- Embedded in between the bus bar insulation for the upper and lower coils is a grounded copper strip, so that each bus bar goes up to  $\pm 4.5$  kV to the strip. The lower coil bus bar insulation had failed to this strip, while the upper coil bus bar had failed to the grounded covers.

In summary one bus bar was in short to the strip, the other to the cover. To allow the machine to operate for two more weeks without jeopardizing the ION run until the bus bar is replaced we :

- removed the ground connection of the strip to resolve the ground problem with the lower coil circuit.
- checked the insulation between the two bus bars (lower bus bar and strip against the upper bus bar, as the lower is in short to the strip) up to 10 kV.
- secured the insulation of the assembly to ground by a polyimide wrap.

The diagnostics and intervention involved 5 persons of TE-MS-C-MNC and took in total about 12 hours shared between the afternoon and morning of the 3<sup>rd</sup> and 4<sup>th</sup>, in a radioactive environment.

★ In addition to the ground fault a small water leak has been temporarily repaired until the bus bar can be changed

## TE-MSC-MNC

### PS Ring, Unit 22 – 23 Bus Bar Insulation Break Down



- Actual repair is a short term solution because the removal from ground potential of the copper shield does no longer protect the bus bar from arcing, thus generating fire
- Replacement of the bus bar by a spare is required
- Possible planning:
  - Removal of the spare for refurbishment and checks: 2 wks. Need for PS access for 2 h
  - Replacement of the bus bar: 1 day (optimized)
  - Sextupole SS07 could be replaced in the mean time if available manpower
  - Vacuum conditioning for septum SS26: 5 to 7 days

En cas de retrait du septum SEH23, il faut tenir compte de l'étuvage du septum SMH26.

5 jours pour un étuvage court, vide attendu ~ 3E-08 mbar.

7 jours pour un étuvage normal, vide attendu ~ 2.5E-09 mbar.