

Spectrometer Questions

1. A full circuit schematic diagram of the discharge diode arrangements, both INTERNAL and EXTERNAL.

This will allow a detailed energy discharge analysis to be performed, to verify that all circuit components are rated accordingly, if not already done.

2. Outline power supply sequence diagram and documentation, from experience during factory testing. This should be open to expansion for additional information gained from magnet mapping tests.

This is required to design effective control software and any interlocking required in the MICE Hall. This could prove a KEY requirement.

3. A specification of the control system is needed to ensure that the system is designed for purpose and meets what is required.

4. Details of the DC contactors used to control the PSU supplies to the spectrometers.

Control of the DC contactors will be undertaken by the MICE Spectrometer control system and incorporating the envisaged PPS interlock of preventing ramp up of PSU's.

5. Detail on supply power rating and voltage of heater on Helium Filling point.

6. Information on the vacuum pumping equipment and pressure feedback gauges that will be used in the MICE Hall, for monitoring/interlock purposes for each spectrometer.

7. Decision on whether earth fault protection is required.

An earth fault / leakage would cause an undetected current to flow in the MICE Hall protection earth network. This will potentially cause monitoring equipment malfunction and Solenoid magnet field errors.

DL EE&PS Group power supply specialists strongly recommend that earth leakage protection/interlocking be implemented.

8. Information on the AMI420 quench detection system and the Lakeshore 60A psu earth leakage

9. Confirmation on the number of and type of instruments (e.g. temperature and level) required to monitor the spectrometer during set-up/cool down and normal operation.

The original number of instruments is known but it is assumed will change due to recovery plan actions/modifications

10. What voltage taps are going to be made available for quench diagnostics to highlight area's of concern and as a means to prevent internal HT lead over heating.

Additional external circuitry (Quench Detection) will be required to achieve this.

Note: At preset during long ramp rates (Many Hours) and with no quench protection, the spectrometer must be supervised at all times.

11. Details on the investigation into the FULL extent of a Helium release in the MICE hall (possibly all 18 magnets) during a quench, to see if additional extraction/monitoring will need to be implemented.
12. Water cooling systems to dump circuits, should be flow and temperature monitored with either UPS back up for an anticipated 30min period of RAPID discharge or evidence submitted to verify the maximum temperature rise does not cause component failure.
13. Resolution on the final number of compressors required to operate the Spectrometers.
14. Progress update on supply of spare PSU's (AMI 420, Xantrex 300A & Lakeshore 60A) to DL for control evaluation.