With reference to attached drawing:

1. Main gas cooled leads (GCL) are protected by voltage taps WC(+) - VT6-A and WC(-) - VT6-T.
   1. Threshold voltage: 100mV
   2. Action: Stop the ramp and initiate slow discharge at 20A/s
2. Superconducting sections between GCL and coils are protected by VT6-A - VTB01 and VT6-T - VTA01. Also splice ½(+) and ½(-) is monitored with same threshold
   1. Threshold voltage: 50mV
   2. Action: Stop the ramp and fast discharge, with energy extraction but without firing quench heaters.
3. Main coil is protected by two half coil voltages VTB01 – ½(+) and ½(-) – VTA01
   1. Threshold voltage: 125mV
   2. Action: Fast discharge with energy extraction and firing quench heaters.
4. Whole coil is monitored by VTs VTB01 and VTA01
   1. Threshold voltage : 1V
   2. Action: Fast discharge with energy extraction and firing quench heaters.

FPGA based quench detector monitors condition 3 and 4 while PXI based quench detector monitors 1,2,3 and 4

Few questions on quench detection system.

1. Please confirm that the quench validation procedure is the same for all quench detection signals in FPGA (or PXI) system

Ans: Yes, quench validation procedure (counter based) is same for both systems and all signals.

1. How 850us of digital output response (decision) time is accumulated in FPGA?

Ans: 850us is hardware propagation time for signal to pass through field programmable gate array.

3. Please confirm that only half-coils and whole-coil signals participate in FPGA quench detection.

Ans: Yes, as mentioned above only half coils and whole coil signals are processed in FPGA quench detector

4. How Cu or SC leads are protected, in which system? It will be useful to have a sketch showing how Cu/SC leads, half-coils and whole-coil signals are formed.

Ans: See attached drawing and its explanation above.

5. What is the purpose of the software "button" disabling the quench detection below 600 A? Please confirm if this capability is available only in PXI system

Ans: Quench detector is disabled during turn ON of power supply. Turn ON transient causes false trip of quench detector. 600A is set as an interlock value. Power supply will not ramp beyond 600A if quench detector is not enabled. This feature is in both systems.

6. What is the maximum dump resistance you can use at low currents?

Ans: We can use 150mohm up to 6000A and 75mohm up to 12000A. 50mohm will be used during training quenches.