BTev/C0 Low Beta Power Supplies

WBS 3.0 *Power Supplies*

Level 3 Manager

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Overview

- Under magnet power supplies, I am going to present the plan for:
  - High current supplies both 10,000 Amp & 5,000 Amp
  - Q2T Shunt across the Q2 magnet of the final focus magnets
  - Correction element power supplies
  - Electrostatic Separators

High Current PS's

- Three 10,000 Amp supplies located at C0 and Four 5,000 Amp supplies located at B4 (2) and C1 (2):
  - Both types of supplies will be NEW and built around a common architecture.
  - The supplies will be purchased from industry with the same philosophy as the Quadrupole Supplies built for the Main Injector.
  - A detail specification will be written for the cabinet, magnetics and SCR bridges. (ie. 9530-ES-309680 MI Quad Specification)
  - Fermilab will supply the voltage and current regulators to be integrated into the supply.
  - This method builds on years of experience and takes advantage of using common regulation equipment that is maintained by our power supply technicians.

Shunts

- The two Q2T shunts will be designed and built at Fermilab using the experience gained by the one installed last January.
  - Fermilab has a history of building shunts and trim power supplies for superconducting magnets.
  - Attention to the protection of the shunt during quenches is most important.
  - This shunt will support uni-polar current up to 200 Amps. The minimum current is expected to be 5-10% of the maximum.

Correction Element PS's

- The Correction Element Power Supplies for C0 Low Beta will be a copy of the four quadrant switchers designed for Main Injector.
  - The System will have a bulk supply that each of the regulator units will use.
  - Regulator units will support +/- 100 volts and +/- 50 amps.
  - BTev needs 13 additional channels that will be located at the C0 service building. Other existing channels located at B4 and C1 will also be used.
  - Main Injector system is shown in the photo. This installation supports 48 channels.

Separator Supplies

- Four separator power supplies are planned for the project. These supplies will be copies of the existing 22 Tev separators.
- The system consists of a controls chassis, +/– 150KV DC power supply, reversing switch and HV discharge resistor.

Conclusion

- The power supply proposal builds on existing Fermilab technology.
- We expect minimal technical risk associated with the power supplies.
- We look at this project as an excellent opportunity to prove our design philosophy as it relates to high current SCR power supplies.