

RMMPS

Reliability, Maintenance, and Improvements

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Reliability

- 41 Total QLI events, 79 hours of downtime.
- 32 during 250 GeV, 9 during 100 GeV.
 - 26 (63%) events had three causes, 51.9 hours (66%).
 - UPS fan fail caused 10 events, 24.5 hours.
 - Current Limit System caused 6 events, 14.7 hours.
 - 720 Hz Chassis out of lock caused 10 events, 12.7 hours.
 - DCCT
 - DCCT failure caused 3 events, 11.2 hours.
 - Reliability problems.
 - Interchangeability problems.
 - The other 12 events had various causes, 18 hours.
 - Airflow sensor failure, Watlow Controller locked up, Ice Ball

Reliability Enhancements

- UPS errors are now latched.
- UPS will be replaced with new model having better communication capability.
 - Broadcast messages.
 - E-mail.
- The Current Limit System was fixed by using a true On-Line UPS to power the relay circuit.

Reliability Enhancements (continued)

- New Regulator Design
 - Eliminate set-point glitches
 - New set-point receiver.
 - Set-point reception will be used to generate interrupt cycles.
 - Set-point data path will go to processor and then to the current set-point DAC.
 - Increase diagnostics
 - Include an FEC for real-time acquisition of internal regulator data.
 - Test-point connectors on each new card for critical signals.
 - Out-of-Lock signal from 720 Hz chassis brought to control system.

Maintenance

- Replace all air-flow sensors.
- Replace YD Watlow Controller with new model.
- Increase spares inventory
 - RMMPS UPS
 - Dipole Ramp Contactor Control System
 - PLC modules

Improvements

- New Regulator
 - For next run
 - Incorporate FEC
 - New Voltage Signal Conditioner Board
 - Problems with the manufacturing of these boards.
 - New Serial Link Board
 - Consolidate the set-point path.
 - Increase robustness of turn-on sequence.
 - Future Plans
 - New Digital Firing Board
 - New Phase Lock Loop Board
 - New DSP Board

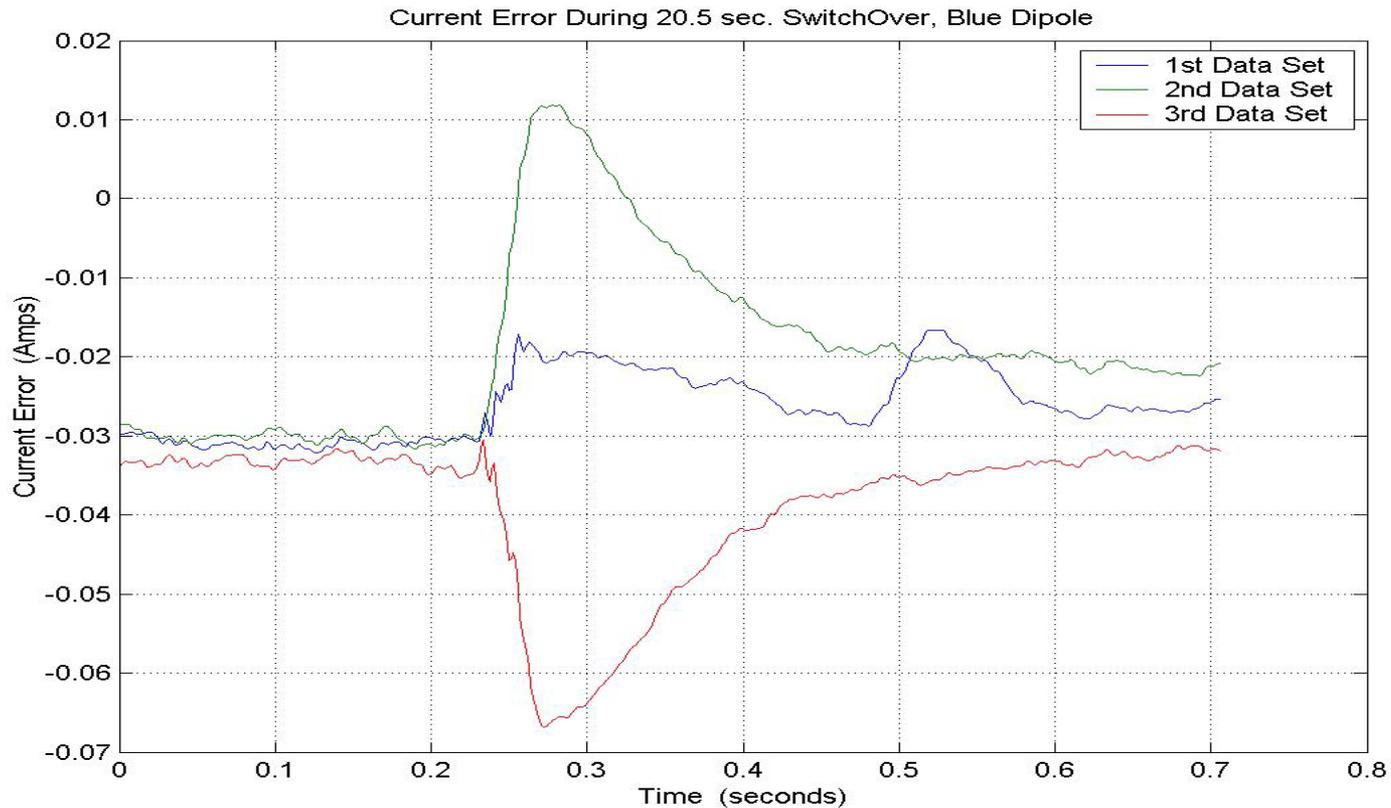
Improvements (continued)

- DCCT
 - For next run
 - Calibrate all DCCTs to a master.
 - Future Plans
 - Replace present DCCTs with newer models.
 - Develop metrology capabilities to calibrate DCCTs.
 - Precision 10 mA source; Metron Designs Ltd.
 - Reverse DCCT head to generate calibration currents (CERN design).
 - Metrology instruments such as resistor and voltage standards.

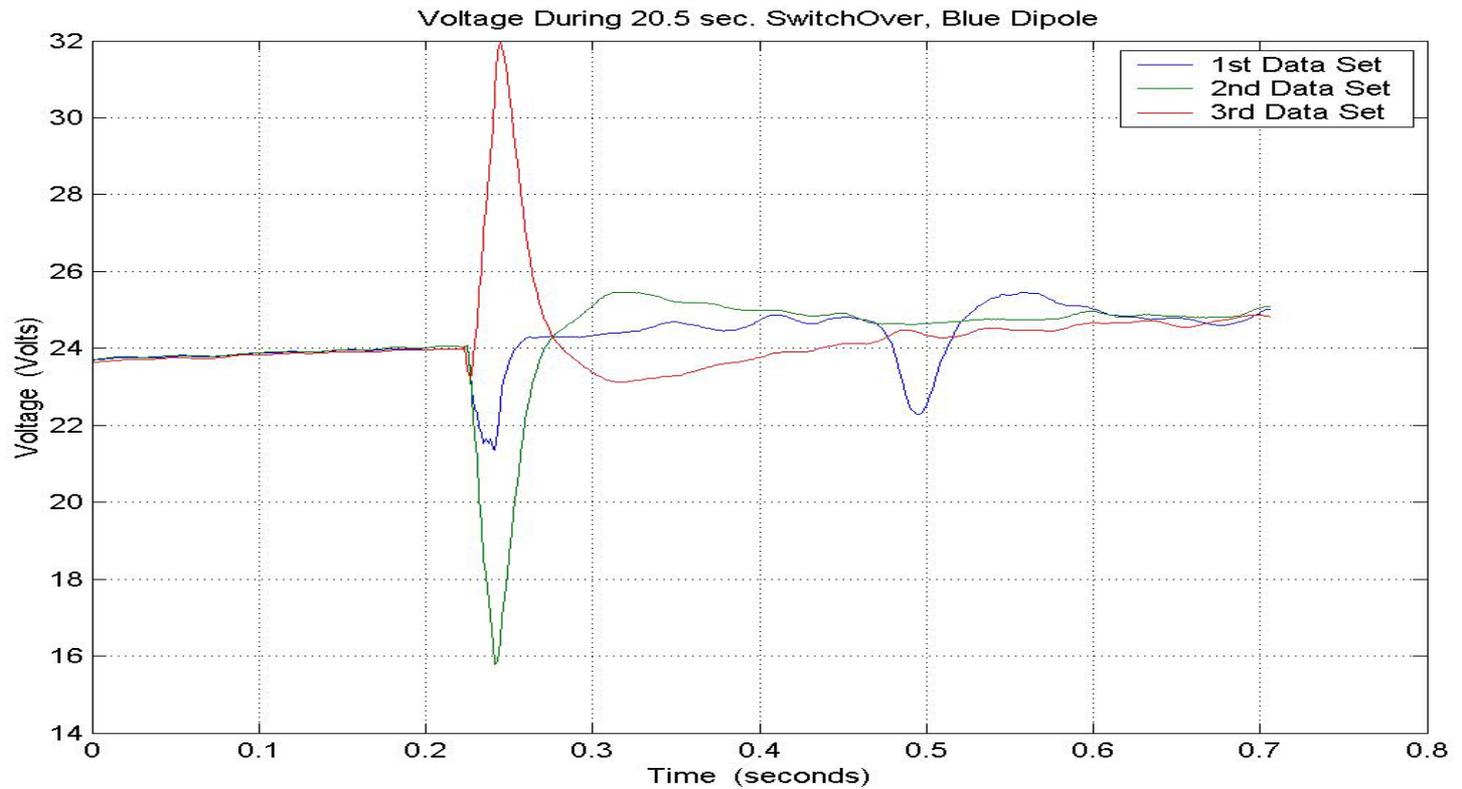
Improvements (continued)

- Fix switch-over transient
 - Power module model is incomplete. Run the power supplies into a resistive load in voltage mode to improve the model.
 - Talking to Inverpower about their model.
 - Talking to IE Power about investigating a humbucker power supply on a parallel path.
 - Model the system first, then, if required, build the system.
- Autotransformers for the Dipole Ramp Power Supplies.
 - Reduce fundamental ripple.
 - Improve switch-over transient (at least from Flattop to Ramp).

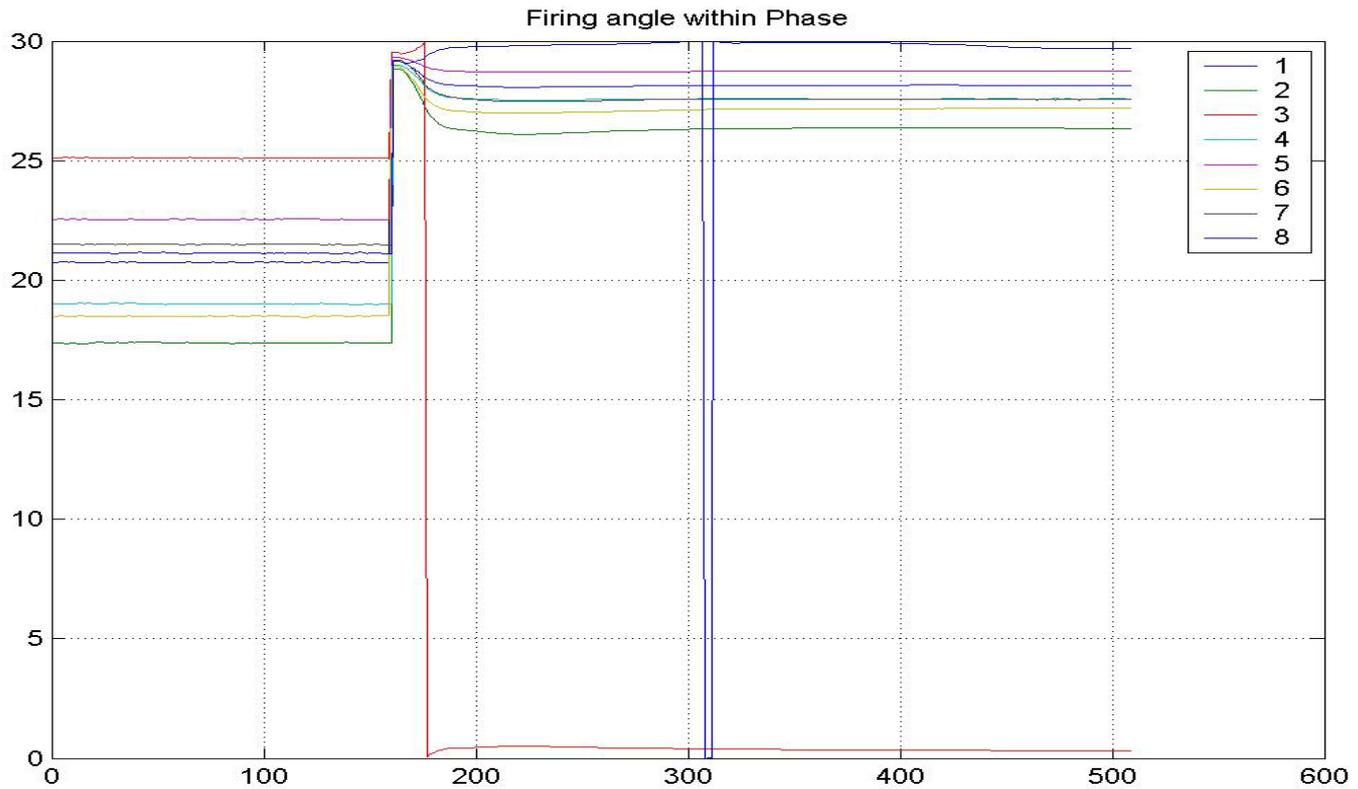
Switch-Over Transient



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Switch-Over Transient

