

***RHIC Physics Run 2002 – 2003, Daily Quench Events
For the month of May 2003***

RHIC Maintenance: Scheduled for 4 Hours

Thursday, May 01, 2003

Quench Event: Blue, 4b-time.A Time of Event: 08:43:44 +3598481
QPA Cntrl / Timing Resolver: b-qtrim-qp pulled / no faults.

Quench Event: Yellow, 4b-time.A Time of Event: 08:43:56 +2502442
QPA Cntrl / Timing Resolver: y-qtrim-qp pulled / no faults.

Thursday, May 01, 2003 at 16:45:00 - Back to Physics!

Thursday, May 01, 2003

Quench Event: Blue, 5b-ps1 Time of Event: 23:41:20 +3784718

Beam Permit Fail Time: Pulled a fraction of a second later at 23:41:20 +3784751 (diff +0.000033sec).

QPA Cntrl / Timing Resolver: Nothing to report, Sextupole qpa's on.

QDAlarms: (5b-qd1) B4QFA6_A7VT, Int. 5, Tq= -23

Postmortems: N/A

Beam Loss Monitors (rads/hr): Sector 4: g4-lm11=4814.92 (Monitor near the b4q11 magnet)

Many in sector 5, indications of double pulses: g5-lm11=2143.75, g5-lm10=4392.74, g5-lm9.2=5008.45, g5-lm9.1=2153.83, g5-lm8.2=3958.89, g5-lm7.2=2626.56g5-lm9.4; 1st peak value= 3450.28 at -4.48sec, 2nd peak value=4854.43 near T=zero, g5-lm9.3; 1st peak value= 5053.96 at -4.44sec, 2nd peak value=5053.96 near T=zero, g5-lm8=4783.39 whereas the peak pulse width at the maximum lasted for over 1.922seconds.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Ramping from Injection to Flat Top Current.

At T=zero: Dipole=1517.58amps, Quad=1425.01amps peak before

Quench Status: **(Real)**, 5min Delay File: QDLD.1051846883 indicates a real quench at the following:

(5b-qd1) B4QFA6_A7VT

Magnet ID Location: Arc Quads Q21, Q19, Q17, Q15, Q13 & Q11

Cause: High Beam Losses.

Technical Notes from the Running Logs:

23:39:37: RHIC acceleration ramp started, ramp id pp9_1051842445

23:41:24: Beam Abort, 5b-ps1 dropped Blue Quench.

23:43:16: Up sequence failed because of AtR magnets turn off, trying to get the sequencer out of the fail mode dumped the beam and quenched blue.

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Sunday, May 04, 2003

Quench Event: Blue, 7b-ps1 **Time of Event:** 14:53:32 +1324933

Beam Permit Fail Time: Pulled fractions of a second later at 14:53:32 +1324968 (diff +0.000035sec).

QPA Cntrl / Timing Resolver: Nothing to report on.

QDAlarms: (7b-qd1) B6DSA4_A3VT, Int. 100, Tq= -24

Postmortems: 1004B indicate that the Blue Dipole Main began oscillating 2.5 seconds before T=zero.

Beam Loss Monitors (rads/hr): No beam in the machine at the time of this Quench Event.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Ramping down from Flat Top Current.

Quench Status: 5min Delay File: QDLD.1052074413 indicates no real quenches.

Cause: Blue Main Dipole Power Supply oscillating.

Sunday, May 04, 2003

Quench Event: Blue, 5b-ps1 **Time of Event:** 14:53:32 +2165574

Beam Permit Fail Time: Already down from the Blue Quench at 23:41:20.

QPA Cntrl / Timing Resolver: Nothing to report on.

QDAlarms: (5b-qd1) Y5DSA3_A2VT, Int. 100, Tq= -24

Postmortems: 1004B indicate that the Yellow Dipole Main began oscillating 3.0 seconds before T=zero.

Beam Loss Monitors (rads/hr): No beam in the machine at the time of this Quench Event.

QD Plot / Main Magnet Power Status: Ramping down from Flat Top Current.

Quench Status: 5min Delay File: QDLD.1052074414 indicates no real quenches.

Cause: Yellow Main Dipole Power Supply oscillating.

Technical Notes from the Running Logs: Beam Abort, 7b-ps1 dropped Blue Quench [Sequencer](#)

15:12:12: comment by Angelika... Both rings went at the very beginning of the downramp, minutes after the beam was dumped.

15:47:12: comment by ganetis... Both blue and yellow quench link trips were caused by quench detectors. The quench detectors tripped because both blue and yellow main dipole power supplies broke out in oscillations on the down ramp. This is a known problem.

Tuesday, May 06, 2003

Permit.9c-ps1, Snake Power Supply/Magnet Failure Data:

Quench Event: Yellow Snake: Yo9-snk7-1.4 **Time of Event:** (Snapshot Time = 00:02:34.433)

QPA Cntrl / Timing Resolver File: yo9-snk7-.1052193755, no faults indicated, Quench Detector pulled first.

Power Supply Status: running at Special operating current of 300.036amps to compensate for failed yo9-snk7-2.3 magnet.

Main Magnet Power Status: Yellow Main Dipole running at Injection Current (473.166amps).

Beam Loss Monitors (rads/hr) Peak Value: y9-lm7.1-snk = 81.330, y9-lm7.2-snk = 240.470

Quench Status: (**Real**), Magnet was operating at high currents.

Technical Notes & Comments from the Running Logs: **00:02:38:** Beam Abort, 10a-ps3.A dropped {Loss Monitor 1}

Cause: **00:17:55:** In the process of finding out the yellow injection loss around PHOBOS, we found a 20mm vertical bump at the left side of the triplet. We brought the bump down and reduce the loss significantly. Then for some reason the switching magnet tripped off and once we got SW magnet on, I took a high intensity bunch by mistake, and quenched yo9-snk7-1.4. So we are waiting to recover. [Sanjee](#)

00:45:10: Thomas reminded us that the bump around the IR10 triplet may be a snake bump; indeed it was a snake bump. Note: These losses appeared mysteriously. So, we put the bump back to 15mm and try to reduce the loss by little steps at a time. [Sanjee](#). [CM](#)

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Tuesday, May 06, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 10:29:36 +477864

Beam Permit Fail Time: Tripped fractions of a second later at: 10:29:36 +477894 (diff of +0.00003sec).

QPA Cntrl / Timing Resolver: No faults indicated, Y-QLO first to trip.

QDAlarms: Positive Tq values.

Postmortems: 1006B show no cause for the event.

Beam Loss Monitors (rads/hr): Sector 9 appeared to be a clean dump.

QD Plot / Main Magnet Power Status: Sitting at Injection current, began down ramping at -0.177sec. However, it appears that Y6QLO2 (Raw) Quench Link Out, tripped first at -0.13298sec.

Quench Status: 5min Delay File: QDLD.1052231376 indicates no real quenches.

Cause: Possible Permit Module or cabling problem.

Technical Notes from the Running Logs: Beam Abort, 6b-ps1 dropped Yellow Quench

No Explanation, MCR recovers the link. (10:43:52: Yellow quench recovery sequence begun [tape](#))

Tuesday, May 06, 2003

Quench Event: Blue, 6b-ps1 **Time of Event:** 14:29:32 +2390784

Beam Permit Fail Time: Pulled fractions of a second later at 14:29:32 +2390814 (diff +0.00003sec).

QPA Cntrl / Timing Resolver: Blue QD, No faults indicated.

QDAlarms: (6b-qd1) B5QDQ9_VT, Int. 5, Tq= -23

Postmortems: 1006B, bi5-qf9 Iref went to full scale, supply tried to respond. Upon investigating, the Housekeeping Power Supply had failed, both fuses found blown. Replaced the Housekeeping Supply. Other supplies affected bo6-qf8 and b6-q89, no faults with those two supplies.

Beam Loss Monitors (rads/hr): Sector 5, near zero doses, Sector 10 DMP looked normal.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: bi5-qf9-ps (Raw) indicated current rise to the rail at -0.11679sec before T=zero. Both Main Supplies were sitting at Store Energy at the time of the fault.

Quench Status: 5min Delay File: QDLD.1052245774 indicates no real quenches.

Cause: Housekeeping Power Supply failed in bi5-qf9-ps.

Tuesday, May 06, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 15:15:24 +566789

Beam Permit Fail Time: Down from the Blue 14:29:32 event.

QPA Cntrl / Timing Resolver: y-qp, yo5-qf8-qp with no faults indicated.

Beam Loss Monitors (rads/hr): Beam had been dumped during the blue abort.

Main Magnet Power Status: Notified MCR to bring them down to Zero Current.

Quench Status: 5min Delay File: QDLD.1052248524 indicates no real quenches.

Cause: Had to shut down yo5-qf8-ps for safety reasons to allow access into the rack to work on replacing the Housekeeping Supply for bi5-qf9-ps. They both share the same main AC Disconnect.

Technical Notes from the Running Logs:

16:18:50: comment by ganetis... Blue quench link trip was caused by 6b-qd1 quench detector. The quench detector tripped because of a power supply fault in bi5-qf9-ps.

Upon Our own observation, Cryo is working in the building and has the Main Roll-up Door wide open. It had been raining this day and it was very damp and humid in the building. This supply is located close to the roll-up door.

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Tuesday, May 06, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 19:53:28 +3514346

Beam Permit Fail Time: Tripped fractions of a second later at: 19:53:28 +3514376 (diff of +0.00003sec).

QPA Cntrl / Timing Resolver: No faults indicated, Y-QLO first to trip.

QDAlarms: Positive Tq values.

Postmortems: 1006B show no cause for the event.

Beam Loss Monitors (rads/hr): Sector 9 appeared to be a clean dump.

Quench Status: 5min Delay File: QDLD.1052265211 indicates no real quenches.

Cause: Possible Permit Module or cabling problem.

Tuesday, May 06, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 22:45:12 +458158

Beam Permit Fail Time: Tripped fractions of a second later at: 22:45:12 +458188 (diff of +0.00003sec).

QPA Cntrl / Timing Resolver: No faults indicated, Y-QLO first to trip.

QDAlarms: Positive Tq values.

Postmortems: 1006B show no cause for the event.

Beam Loss Monitors (rads/hr): No beam in the machine.

Quench Status: 5min Delay File: QDLD.1052275512 indicates no real quenches.

Cause: the 6b-ps1 permit module, VME card, Transition Module and the Connector Panel were replaced.

Technical Notes from the Running Logs:

19:53:00: Setup is off. A pp9 and rot1 ramp was successful, but a Yellow QLI occurred prior to steering or collimating.

20:01:09: We cogged using RF:CogToCollision with no separation bumps without incident. The QLI was about five minutes afterwards. [ADM](#)

22:28:49: With assistance from Wing Louie, a pair of cables on the permit bypass chassis in 1006B were pulled and reseated. A try to the yellow quench recovery, and it failed once again. Wing informed that the 6b-ps1 permit module needed to be replaced. Ed Koropsak came in to do the job. He replaced the VME card, transition module and the connector panel. Yellow link recovered fine but the Blue Quad Mains would not ramp. Don Bruno was notified and suggest Carl Schultheiss be called. (See next quench Event Blue 10a-ps3.A below)

Wednesday, May 07, 2003

Quench Event: Blue, 10a-ps3.A **Time of Event:** 00:23:04 +1440770

Beam Permit Fail Time: Down from the previous Yellow Quench Event at 22:45:12, Tuesday, May 6th.

QPA Cntrl / Timing Resolver:

QDAlarms: None listed.

Postmortems: Supplies at Zero currents.

Beam Loss Monitors (rads/hr): No beam in the machine.

Dx Heaters that fired: None fired

Quench Status: 5min Delay File: QDLD.1052281385 indicates no real quenches.

Cause: Blue Quad Main power supply = Reg Watchdog Fault.

Technical Notes from the Running Logs:

02:43:41: Carl restarted the Processor for b-qmain and things looked good. When we tried to resume the recovery script Blue link went down. We suspect it is because the supplies were already at 50A when the script tried to turn on the supplies. Carl will investigate to make sure. We are running the recovery script again. [Sanjee](#).

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Wednesday, May 07, 2003

Quench Event: Blue, 2b-ps1 **Time of Event:** 02:36:40 +3813199

Beam Permit Fail Time: Pulled fractions of a second later at 02:36:40 +3813229 (diff +0.00003sec).

QPA Cntrl / Timing Resolver: b-qpa, QP11-R2BD2-b2-dhx-qp, Crowbar

QDAlarms: None.

Postmortems: b2-dhx-ps, appears that the Iref began to take off, current lagging behind then suddenly spiking upwards to 100amps causing a large voltage spike, railing to 10volts causing the QPA to Crowbar.

Beam Loss Monitors (rads/hr): No beam in the machine at this time.

Dx Heaters that fired: None fired

Quench Status: 5min Delay File: QDLD.1052289403 indicates no real quenches.

Cause: Crowbar Fault for b2-dhx.

Technical Notes from the Running Logs: MCR tried to resume the recovery script and the Blue link went down. They suspected it was because the supplies were already at 50A when the script tried to turn on the supplies.

Wednesday, May 07, 2003

Quench Event: Yellow, 8b-ps1 **Time of Event:** 03:05:20 +2150083

Beam Permit Fail Time: Tripped fractions of a second later at: 03:05:20 +2150113 (diff of +0.00003sec).

QPA Cntrl / Timing Resolver: No faults indicated, Y-QD QLI first to trip.

QDAlarms: (8b-qd2) Y7QFQ2_VT, Int 1, Tq= -24.

Postmortems: yi7-qf3-ps, Iref took to the rail, voltage followed.

Beam Loss Monitors (rads/hr): No data available at this time.

QD Plot / Main Magnet Power Status: Ramping down, yi7-qf3-ps (Raw) shows it tripped at -0.3323sec before T=zero.

Quench Status: 5min Delay File: QDLD.1052291122 indicates no real quenches.

Cause: yi7-qf3-ps Housekeeping Power Supply failed, blown fuses found, supply was replaced.

Technical Notes from the Running Logs:

03:13:00: Yellow QLI during the hysteresis ramp. 'wfg:yo9-qf6 test failed' error message appeared in the wfgman. Quench summary page reveals that 8b-ps1 went down. Carl Schultheiss is in MCR and looking. [Sanjee](#)

Carl determined that the housekeeping power supply had failed. Don Bruno was called and notified Joe Drozd who came in to replace it.

Wednesday, May 07, 2003

Quench Event: Blue, 5b-ps1 **Time of Event:** 07:19:44 +1137310

Beam Permit Fail Time: Pulled almost two minutes before at 07:17:56 +3660294

QDAlarms: (5b-qd1) B4DSA4_A3VT, Int. 5, Tq= -24

Postmortems: 1004B Blue Dipole Main Oscillating -0.141sec before T=zero.

Beam Loss Monitors (rads/hr): Sector 4: Clean, Sector 10 DMP: appeared normal.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Dipole at 1941.18amps, ramp down starting at -5.764 before T=zero.

Quench Status: 5min Delay File: QDLD.1052306385 indicates no real quenches.

Cause: Blue Main Dipole Power Supply Oscillating during the Flattop to Ramp Down Current Transition.

Technical Notes from the Running Logs:

07:18:02 Beam Abort, 10a-ps3.A dropped {Loss Monitor 1} [Sequencer](#)

07:19:46 Quench Link Interlock in Blue ring, 5b-ps1 dropped first [Sequencer](#)

07:39:58: comment by gjm... QLI was after initiating the down ramp. Definitely not beam.

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Friday, May 09, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 01:40:36 +1380623

Beam Permit Fail Time: Tripped fractions of a second later at: 01:40:36 +1380653 (diff of +0.00003sec).

QPA Cntrl / Timing Resolver: No faults indicated, Y-QLO first to trip.

QDAlarms: Positive Tq values.

Postmortems: 1006B show no cause for the event.

Beam Loss Monitors (rads/hr): Sector 9 appeared to be a clean dump.

Quench Status: 5min Delay File: QDLD.1052458837 indicates no real quenches.

Cause: Possible Permit Module or cabling problem.

Friday, May 09, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 02:58:44 +3267851

Beam Permit Fail Time: Tripped fractions of a second later at: 02:58:44 +3267881 (diff of +0.00003sec).

QPA Cntrl / Timing Resolver: No faults indicated, Y-QLO first to trip.

QDAlarms: Positive Tq values.

Postmortems: 1006B show no cause for the event.

Beam Loss Monitors (rads/hr): Sector 9 appeared to be a clean dump.

Quench Status: 5min Delay File: QDLD.1052463527 indicates no real quenches.

Cause: Possible Permit Module or cabling problem.

Technical Notes: The building 1006B YQLI problem, events happened as follows as per Wing Louie

1. May 6, 2003 (Tuesday) 10:29:52 YQLI happened. The Quench Summary pet indicated 1006B was the first that dropped the Quench Link. The Timing Resolver at 1006B indicated the YQLO signal was the first that dropped. Nothing was done, the system was brought back up and the run continues.
2. May 6, 2003 (Tuesday) 19:53:51 YQLI happened. The Quench Summary pet indicated 1006B was the first that dropped the Quench Link. The Timing Resolver at 1006B indicated the YQLO signal was the first that dropped. Nothing was done, the system was brought back up and the run continues.
3. May 6, 2003 (Tuesday) 22:45:28 YQLI happened. The Quench Summary pet indicated 1006B was the first that dropped the Quench Link. The Timing Resolver at 1006B indicated the YQLO signal was the first that dropped. Permit module was replaced by Ed Koropsak at 00:23:19, May 7, 2003. The system was brought back up and the run continues.
4. May 9, 2003 (Friday) 01:41:04 YQLI happened. The Quench Summary pet indicated 1006B was the first that dropped the Quench Link. The Timing Resolver at 1006B indicated the YQLO signal was the first that dropped. Nothing was done, the system was brought back up and the run continues.
5. May 9, 2003 (Friday) 02:59:13 YQLI happened. The Quench Summary pet indicated 1006B was the first that dropped the Quench Link. The Timing Resolver at 1006B indicated the YQLO signal was the first that dropped. A temporary cable from the Permit Module to the Beam Permit Bypass chassis was installed, which replaced the existing cable by Dan Oldham and CAD operators.

1006B is the building that had intermittent QLIs a few months ago. We did hook up a Timing analyzer tried to catch and find the problem, but no QLI had happened after the analyzer was installed. About three weeks ago, we disconnected the analyzer and restored the system. As indicated above, QLI happened again.

Solution:

1. Run a new RG58 cable from the Permit Module to the Beam Permit Bypass Chassis.
2. Replace the Beam Permit Bypass chassis (Maybe the chassis connector caused the intermittent). By replacing the above two items, every components that can cause the Yellow QLI will be replaced.

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RHIC Maintenance: Scheduled for 4 Hours

Friday, May 09, 2003

Quench Event: Blue, 4b-time.A Time of Event: 08:17:08 +1733803
OPA Cntrl / Timing Resolver: b-qtrim-qp pulled / no faults.

Quench Event: Yellow, 4b-time.A Time of Event: 08:17:24 +13409
OPA Cntrl / Timing Resolver: y-qtrim-qp pulled / no faults.

Friday, May 09, 2003 at 15:30:00 - Back to Physics!

15:16:42: RHIC ring secured. 15:30:00: Machine Setup.

Saturday, May 10, 2003

Permit. , 9a-ps3 dropped {Quench - Rotator} Data:

→ **Quench Event: Blue Rotator: bi8-rot3-1.4-ps / (Int. 100) Time of Event: (Snapshot Time = 05:28:09)**

OPA Cntrl / Timing Resolver File: 1052558890, no faults listed, QD-bit-3 pulled first.

Spin Rotator Power Supply Status: running at operating current of 216.48amps.

Main Magnet Power Status: Blue Main Dipole running at Store Current of 1941.19amps.

Beam Loss Monitors (rads/hr): Beam abort appeared normal.

Quench Status: **(Real)**

→ **Quench Event: Blue Rotator: bi8-rot3-2.3-ps / (Int. 5) Time of Event: (Snapshot Time = 05:28:15)**

OPA Cntrl / Timing Resolver File: 1052558896, no faults listed, QD-bit-4 pulled first.

Spin Rotator Power Supply Status: running at operating current of 182.207amps.

QD Plots: Voltage taps indicate perturbation (Heat transfer) began at -5.72695sec, the time interval between the bi8-rot3-1.4 and the time bi8-rot3-2.4 quenched. A large spike indication occurred at -2.71507sec prior to T=zero.

Quench Status: **(Real)**

Technical Notes & Comments from the Running Logs:

05:30: Blue quench link interlock. Awaiting cryogenic control approval to recover the link. Bi8-rot1-1.4 has a ground fault. (Alarm log shows this fault) 06:30: Blue link has been recovered. Don Bruno and G. Ganetis are investigating the rotator ground fault.

07:28:30: comment by ganetis... bi8-rot3-1.4 quenched because the 9a-qd1quench detector tripped it. The quench detector tripped because the p.s. iref dropped and caused very high ramp rate. Bi8-rot3-1.4-ps no p.s. faults but there was something wrong with it. Don Bruno may have to look at it if this happens again. There was also high ground current when this quench happened, we will just watch this for now. bi8-rot3-2.3 quenched because of warm gas from the quench of bi8-rot3-1.4.

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Saturday, May 10, 2003

Quench Event: Blue, 8b-ps1 **Time of Event:** 05:28:32 +2578349

Beam Permit Fail Time: Pulled first at 05:28:12 +787901 (diff of +18 seconds).

QPA Cntrl / Timing Resolver: b-QD QLI tripped first, no faults indicated.

QDAlarms: (8b-qd1) B8DRBU9_0VT, Int. 100, Tq= -22

Postmortems: Power supplies not the cause. However, wfg.bo7-qb2-ps.inputM and wfg.bo7-qd3-ps.inputM indicate that their signal began pulsing after T=zero.

Beam Loss Monitors (rads/hr): Sector 8 levels at zero, Sector 10 appeared as a normal beam abort with high levels at the Beam Dumps and levels reaching to the CQS5 magnet.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Dipole running at Store Energy of 1941.18amps, B8DRBU9_0VT spiked negative at +0.05007sec down to a level of -0.44564volts.

Quench Status: 5min Delay File: QDLD.1052558914 indicated no real quenches:

Cause: 07:33:50: comment by ganetis... blue quench link trip was caused by 8b-qd1 quench detector. The quench detector tripped because of a **REAL BUSS Quench in B8DRBU9_0VT**. The bus quenched because of warm gas from both spin rotators quenching.

Technical Notes from the Running Logs: (*See additional notes from previous Rotator Quench on page 7*)

05:44:01 Beam aborted due to quench in rotators bi8-rot3-1,4 and bi8-rot3-2.3-ps, but the cause of the quench is not clear. No power supply trips observed. However, we do have loss monitor permit failure from y9-lm7.1-snk and two ion pumps trip off: bi8-ip-pw3.3 and pw3.2. [LH](#)

05:46:30 Cryo reports rise of 2 degrees in 8 o'clock. We wait for clearance before returning to injection.

05:48:15 Blue quench recovery sequence begun [tape](#)

Tuesday, May 13, 2003

Quench Event: Blue, 6b-ps1 **Time of Event:** 01:27:24 +2493361

Beam Permit Fail Time: Pulled fractions of a second later at 15:27:24 +2493391 (diff +0.00003 seconds).

QPA Cntrl / Timing Resolver: b-QD QLI tripped first, no faults indicated.

QDAlarms: (6b-qd1) B6QFQ3_VT, Int. 5, Tq= -24

Postmortems: Power supplies not the cause.

Beam Loss Monitors (rads/hr): Sector 6 highest levels: *b6-lm3.1=4471.32 peak level for approx 1 second*, g6-lm1=4476.43, g6-lm-srt.w=4427.28.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Running at store currents, B6QFQ3_VT (Raw) signature not the same as corresponding taps of the same type.

Quench Status: (**Real**), 5min Delay File: QDLD.1052803646 indicates a real quench at the following:

(6b-qd1) B6QFQ3_VT

Cause: Cryo Lead Flow.

Technical Notes from the Running Logs: 10:16:06: comment by ganetis... blue quench link trip was caused by 6b-qd1 quench detector. The quench detector tripped because of a real magnet quench at B6QFQ3_VT. The beam permit tripped after the quench link. There was one real quench at b6q3. There was high beam loss at this location for over one sec. Why aren't the BLMs tripping the beam permit for a loss this big? The cause of the beam loss was the lead flow fault for the blue corrector p.s. in alcove 5b. This tripped out all the blue corrector p.s. in this alcove.

MCR Morning 07:13:06: Shift-end Summary: Shortly after the start of a RHIC store for physics, a Blue QLI and loss monitor permit interlock occurred. The Cryo Control Room found that they had to make a tunnel access to restore lead flow communications at 5Q3. After attempting to swap out interface cards, they discovered that one of the six thermistors in the manifold at 5Q3 had failed. As of the end of the shift, the thermistor has been replaced and recalibration has commenced.

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Tuesday, May 13, 2003

Quench Event: Blue, 2b-ps1 **Time of Event:** 07:56:48 +2623848

Beam Permit Fail Time: Still down from the previous blue, 6b-ps1-quench event at 15:27:24.

QPA Cntrl / Timing Resolver: b-qpa-bo2-qd1-ps no faults indicated.

QDAlarms: None

Postmortems: Power supplies not the cause.

Beam Loss Monitors (rads/hr): No beam in the machine at this time.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Running at Park currents.

Quench Status: 5min Delay File: QDLD.1052827010 indicates no real quenches.

Cause: MCR Abort the Recovery Program for Cryo.

Technical Notes from the Running Logs: 08:08:17: comment by BvK. We were sitting with the mains at park, trying to bring the remaining IR power supplies. Cryo request ~15 min to see if things are stable.

13:24:41: comment by ganetis... The blue quench link tripped because of an ac phase fault in bo2-qd1-ps. The p.s. had the fault when the p.s. was being commanded to standby from the on state. This was not normal operation for it. Some p.s. were in the on state from an earlier operator canceled quench recovery. The operator canceled the recovery because of an FEC problem in 2b-ps1 that prevented the recovery to continue. The FEC should have been reset and then the recovery could have continued.

Tuesday, May 13, 2003

Quench Event: Blue, 10a-ps3.B **Time of Event:** 08:43:48 +1443988

Beam Permit Fail Time: Pulled fractions of a second later at 08:43:48 +1444017 (diff +0.000029 seconds).

QPA Cntrl / Timing Resolver: b-B1 QLO / no faults indicated.

QDAlarms: None

Postmortems: Power supplies at zero currents, didn't see any problems.

Beam Loss Monitors (rads/hr): No beam in the machine at this time.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Mains at zero currents but the Iref indicated 50 amps.

Quench Status: 5min Delay File: QDLD.1052829829 indicates no real quenches.

Cause: 6 KA quench protection switch in 1010 a service bldg.

Technical Notes from the Running Logs: 14:22:04: comment by ganetis... This blue quench link trip was caused by the 6 KA quench protection switch in 1010 a service bldg. The switch tripped the link because it was given an off command from the quench recovery program. The problem is that the switch was already on and the link was up when MCR ran the recovery program. The reason the recovery program was run because of the previous failed recovery at 8:12. That recovery failed because of a state test of the 6 KA switch failed. The recovery program got a different status because the program was stopped to reboot 8b-ps3, this added about 5 min. The 6 KA switch went to a correct state but one the recovery program did not recognize. The fix is to change the recovery program.

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

RHIC Maintenance: Scheduled for 4 Hours

Friday, May 16, 2003

Quench Event: Blue, 4b-time.B Time of Event: 08:43:24 +1186570
QPA Cntrl / Timing Resolver: Mains Crash Switch BQLI/SW pushed.

Quench Event: Yellow, 4b-time.B Time of Event: 08:43:24 +2121370
QPA Cntrl / Timing Resolver: Mains Crash Switch YQLI/SW pushed.

Friday, May 16, 2003 at 11:59:07 - Back to Physics!

Friday, May 16, 2003

Quench Event: Blue, 6b-ps1 Time of Event: 20:06:36 +513403

Beam Permit Fail Time: Pulled fractions of a second later at 20:06:36 +513433 (diff +0.00003 seconds).

QPA Cntrl / Timing Resolver: b-QD QLI / no faults indicated.

QDAlarms: (6b-qd1) B5QFQ2_VT, Int. 5, Tq= -24

Postmortems: 1006 Power supplies did not cause the trip, 1004 shows bi4-tq4-ps Iref drop to zero at -1.33sec.

Beam Loss Monitors (rads/hr): g5-lm1=4014.81, b5-lm3.1=3419.40

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Blue Quad=1826.48, Store Energy. The voltage tap for B5QFQ2 decays sharply after the event whereas the voltage taps for B5QFQ3 and B5QFQ1 decay at a much slower, evenly rate.

Quench Status: **(Real)**, 5min Delay File: QDLD.1053129996 indicates a real quench at the following:
(6b-qd1) B5QFQ2_VT {B5q2 magnet}

Cause: bi4-tq4-ps tripped off causing beam loss.

Technical Notes from the Running Logs:

22:39:38: comment by ganetis... blue quench link trip was caused by the 6b-qd1 quench detector. The quench detector tripped because of a real magnet quench at B5QFQ2_VT. The beam permit tripped after the blue quench link. There was a real magnet quench at b5q2. There were high losses at this location .25 sec. before the quench link trip. The beam loss started about 1.2 sec. before the quench link trip. bi4-tq4-ps tripped about 1.33 sec. before the blue quench link trip. It looks like this tq tripped and caused the beam loss that quenched b5q2. Why didn't the beam loss system pull the beam permit before the magnet had quenched?

02:16:56 Initially, bi4-tq4-ps tripped because the qpa tripped on a crowbar fault. I believed bi4-tq4-ps had a problem with its current regulator card (relays?). When the spare current regulator card was installed the p.s. tripped on a crowbar fault immediately upon turn on of the power supply. We thought the same problem was still there. We thought the current regulator card was not the problem so the power supply was swapped out, then when that did not work the qpa was swapped out. I also asked Rich and Tim to check the output of the fiber optic card and it was zero as it should be. They swapped the fiber optic card anyway, this did not work. I asked Tim and Rich to put the p.s. into voltage mode and turn it on locally. This did work. This meant there was a problem in the current loop. They measured the resistance of the load and it was very, very low as it should be. I asked them to put the original current regulator card in and the p.s. did turn on without a crowbar fault. There was something wrong with the spare current regulator card. I did not want to leave the original current regulator card in the p.s. because I still think that was the original problem. The original card would cause the qpa to trip on a crowbar fault after running for awhile at around 25A. They got another spare current regulator card, installed it and this one looks like it works. I ran the p.s. to +25A and -25A and it looked ok. We should keep an eye on it to make sure. [Don](#)

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

Saturday, May 17, 2003

Quench Event: Yellow, 4b-time.A

Time of Event: 02:26:56 +1933630

Beam Permit Fail Time: Pulled fractions of a second later at 02:26:56 +1933660 (diff +0.00003 seconds).

QPA Cntrl / Timing Resolver: y-B1 QLI / no faults indicated.

QDAlarms: (4b-qd2) Y4DRDO_DO, Int. 5, Tq= -22
(6b-qd2) Y5QFQ2_VT, Int. 5, Tq= -24

Postmortems: Mains sitting at Injection Current, 1004 Tq Power Supplies at zero currents. At T= -0.199sec, yi3-tq5 spikes negative as the Iref goes from zero to -12.56 amps, the current tries to follow.

Beam Loss Monitors (rads/hr): No beam in the machine at this time.

QD Plot / Main Magnet Power Status: Mains at Injection Current. Voltage taps Y4DRD0_D0 and Y3DRD0_D0 track the same after the event showing an even decay. Voltage taps Y5QFQ1_VT, Y5QFQ2_VT and Y5QFQ3_VT also appear to decay evenly after the event.

Quench Status: 5min Delay File: QDLD.1053152817 indicates no real quenches.

Cause: Operator Error

Technical Notes from the Running Logs:

11:20:17: comment by ganetis... yellow quench link trip was caused by 4b-qd2 quench detector. The quench detector tripped because of sudden change in y4-dh0-ps current signal going into the quench detector. The change in the current signal was caused by a known cross-talk problem between the tq ps and dh0 ps in the quench detectors. The problem only happens if the tq are changing to the OFF state when the dh0 is at a current. This is not a normal condition. Why were the yellow tq in the off state ? Also why were the tq iref at injection levels when these ps were in the off state ? There also seemed to be a problem with the quench recovery of these tq ps. At no time should a tq ps be in the off state when the rest of the ring is above zero current.

19:40:10: comment by JPJ... Ok. I did not know that. Don explained that he turned them off (or they tripped?) during troubleshooting of the bi4-tq4 problem. I did not see the alarm prior to ramping to injection, and the TAPE sequence does not indicate what state the power supplies have to be in to run the recovery. But now we know.

22:35:26: comment by Don... I think I know what happened. When Rich and Tim were working on bi4-tq4-ps they locked out the 208VAC power to the rack and the 110VAC power to the rack as well. The node card that feeds all the tq's is in this rack so it lost 110VAC power which drops all the tq's the OFF state. Since all the p.s.'s were at zero current at this point the main yellow link stayed up, for now. While I was testing from home I was bringing the blue tq QPA's on and the blue tq p.s.'s on but I did not realize the yellow tq's had tripped OFF because the node card had lost 110VAC power. After I saw MCR had the blue link up I scanned through the p.s.'s to make sure everything was ok and noticed that the yellow tq's (in 1004B) were OFF and they started doing a hysteresis ramp. I told them about the yellow tq's being OFF in 4b and they said they would use the tq TAPE to bring them back on. I forgot to mention that all the p.s.'s, in both rings, should be at zero current before they run TAPE for the tq's, I guess when they ran TAPE and tried to put the tq's into STBY or ON the yellow link came down. I am not clear yet on if bringing the tq's to STBY or ON brought the yellow link down. I will ask John Morris to add a statement to the TAPE for the tq's that says all the p.s.'s must be at zero current before the TAPE can be run for the tq's.

Sunday, May 18, 2003

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

Quench Event: Blue, 6b-ps1 **Time of Event:** 17:52:56 +3553649

Beam Permit Fail Time: Pulled fractions of a second later at 17:52:56 +3553679 (diff +0.00003 seconds).

OPA Cntrl / Timing Resolver: b-QD QLI/ no faults indicated.

QDAlarms: (6b-qd1) B6QFQ2_VT Int. 1, Tq= -24

Postmortems: 1006 Power supplies did not cause the trip, bo6-qd1, qf2 and qd3 along with bi5-qf1, qd2 and qf3 all show evidence of a quench occurring.

Beam Loss Monitors (rads/hr): High rates near the Sector 5 Triplet Region through the Cross-Over to Sector 6 Triplets down to lm5.1. Also, multiple losses found in Sector 12.

Sector 5: b5-lm3.1=4935.45, g5-lm1=4956.04, y5-lm0=5000.17, b5-lm0=4829.78

Sector 6: g6-lm1=4599.39, b6-lm3.1=4470.23

Sector 12: b12-lm4=4506.13, g12-lm5=4786.67, g12-lm6=4779.69

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Mains running at Store Energy. Voltage taps B6QFQ2, B5QFQ2, B5QFQ3 and B12QFQ4_6 indicate sharp decay values compared to voltage taps of similar magnets.

Quench Status: **(Real)**, 5min Delay File: QDLD.1053294779 indicates real quenches at the following:

(6b-qd1) B5QFQ3_VT, B5QFQ2_VT, B6QFQ2_VT

(12a-qd1) B12QFQ4_6VT

Cause: High Beam Losses

Technical Notes from the Running Logs:

21:28:04: comment by ganetis... blue quench link trip was caused by 6b-qd1 quench detector. The quench detector tripped because of a real magnet quench at B6QFQ2_VT. The beam permit tripped after blue quench link. There were four real magnet quenches at b5q2, b5q3, b6q2, and b12q4. There were high losses at these locations. The beam loss was still high for .5 sec after the beam was aborted.

21:26:33 George did not find any evidence of wrong doing by the power supplies on the Blue QLI. In other words, it was a real quench. He also noted that the beam abort appeared to be later then it should have been. [JPJ](#)

RHIC Maintenance: **Unscheduled due to Vacuum Failure in RF**

Monday, May 19, 2003

Quench Event: Blue, 4b-time.A

Time of Event: 09:07:00 +3090667

OPA Cntrl / Timing Resolver: b-qtrim-qp pulled / no faults.

Quench Event: Yellow, 4b-time.A

Time of Event: 09:07:16 +1523333

OPA Cntrl / Timing Resolver: y-qtrim-qp pulled / no faults.

Monday, May 19, 2003 at 17:00:00 - Back to Physics!

16:44:34: All p.s. testing is complete. We do not need any more time at the end of the hysteresis ramp [ganetis](#)

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

Wednesday, May 21, 2003

Permit. , 3c-ps1 dropped {Quench - Snake} Data:

→ **Quench Event:** Blue Snake: B03SNK7R2_GL / (Int. 1) **Time of Event:** (Snapshot Time = 00:41:48.700)

OPA Cntrl / Timing Resolver File: 1053592109, no faults listed, QD-bit-3 pulled first.

Snake Power Supply Status: running at operating current of 325.98amps.

Main Magnet Power Status: Running at Store Currents.

Beam Loss Monitors (rads/hr): Beam abort appeared normal, low values in this sector.

Quench Status: **(Real)**

→ **Quench Event:** Blue Snake: bo3-snk7-1.4 / (Int. 5) **Time of Event:** (Snapshot Time = 00:41:52.333)

OPA Cntrl / Timing Resolver File: 1053592109, no faults listed, QD-bit-4 pulled first.

Snake Power Supply Status: running at operating current of 99.98amps.

QD Plots: Voltage taps indicate perturbation (Heat transfer) occurred +3.58sec after the B03SNK7R2 Gas Cooled lead quenched causing bo3-snk7-1.4 to quench. Time interval between the two snapshot photos is 3.633 seconds.

Quench Status: **(Real)**

Cause: Gas Cooled Lead Interlock for bo3-snk7-2.3.

Technical Notes from the Running Logs:

00:41:53: Beam Abort, 3c-ps1 dropped {Quench - snake} [Sequencer](#)

00:41:54: Quench Link Interlock in Blue ring, 4b-time.A dropped first [Sequencer](#)

00:53:17: comment by gjm... snake came first, followed by Blue quench of 'B3QDQ8_VT Int 5'.

03:57:09: comment by ganetis... bi3-snk7-2.3 tripped because of a gas cooled lead interlock in quench detector 3c-qd1. In talking with Cryo I found one of the flow controllers not reading the correct measured value. This should have created an alarm for Cryo but it did not. This flow controller in the tunnel will have to be repaired.

Wednesday, May 21, 2003

→ **Quench Event:** Blue, 4b-time.A **Time of Event:** 00:41:48 +2000284

Beam Permit Fail Time: Tripped first at 00:41:48 +740178 (diff -1.260106seconds).

OPA Cntrl / Timing Resolver: b-QD QLI/ no faults indicated.

QDAlarms: (4b-qd1) B3QDQ8_VT Int. 5, Tq= -23

Postmortems: Show no indications that any power supplies had caused the event.

Beam Loss Monitors (rads/hr): Appeared to be a normal beam abort, Sectors 3 and 4 showed very low rates.

Dx Heaters that fired: None fired

QD Plot / Main Magnet Power Status: Mains running at Store Energy. Voltage tap B3QDQ8 indicated a rise of 0.06volts prior to T=zero but then a sharp fall below 2.8volts. However, B3QFBU9_7VT also indicated the same pattern.

Quench Status: **(Real)**, even though the 5min Delay File: QDLLD.1053492110 indicated no real quenches, there a Real Buss Quench (*Read Technical Notes Below*).

Cause: Gas Cooled Lead Interlock for bo3-snk7-2.3.

Technical Notes from the Running Logs:

09:50:38: comment by ganetis... blue quench link trip was caused by 4b-qd1 quench detector. The quench detector tripped because of a real bus quench at B3QDQ8_VT. The beam permit tripped 1.26 sec before the quench link. The quench of bi3-snk7-2.3 caused warm gas that quenched the quad bus that goes through the snake magnet.

***RHIC Physics Run 2002 – 2003, Daily Quench Events
For the month of May 2003***

Wednesday, May 21, 2003

Permit. , 3c-ps1 dropped {Quench - Snake} Data:

→ **Quench Event:** Blue Snake: B03SNK7R2_GL / (Int. 1) **Time of Event:** (Snapshot Time = 01:59:48.833)

QPA Cntrl / Timing Resolver File: 1053496789, no faults listed, QD-bit-3 pulled first.

Snake Power Supply Status: running at operating current of 325.91amps.

Main Magnet Power Status: Ramping from the start of Park Current to Injection Current, Ramps Rate of approximately 1.5 amps per second.

Beam Loss Monitors (rads/hr): No Beam in the machine at this time.

Quench Status: **(Real)**

→ **Quench Event:** Blue Snake: bo3-snk7-1.4 / (Int. 5) **Time of Event:** (Snapshot Time = 01:59:52.766)

QPA Cntrl / Timing Resolver File: 1053496789, no faults listed, QD-bit-4 pulled first.

Snake Power Supply Status: running at operating current of 99.98amps.

QD Plots: Voltage taps indicate perturbation (Heat transfer) occurred +3.88sec after the BO3SNK7R2 Gas Cooled lead quenched causing bo3-snk7-1.4 to quench. Time interval between the two snapshot photos is 3.933 seconds.

Quench Status: **(Real)**

Cause: Gas Cooled Lead Interlock for bo3-snk7-2.3.

Technical Notes from the Running Logs:

00:59:22: Blue quench recovery sequence begun [tape](#)

01:19:27: Cryo re cooler levels are dropping so now we wait...[gjm](#)

01:59:51: Beam Abort, 3c-ps1 dropped {Quench - snake} [Sequencer](#)

04:00:46: comment by ganetis... bi3-snk7-2.3 tripped due to a gas cooled lead interlock. The flow controller is not working and Cryo now knows of the problem and will have to fix it.

Saturday, May 24, 2003

→ **Quench Event:** Blue, 10a-ps3.A **Time of Event:** 14:16:40 +3236290

Beam Permit Fail Time: Pulled first at 13:19:36 +1049927 (diff + better then 57minutes).

QPA Cntrl / Timing Resolver: Blue supplies down / no faults indicated.

QDAlarms: (10a-qd1) appears not to be responding (Condition of readback = Pink).

Postmortems: N/A

Beam Loss Monitors (rads/hr): No beam at the time.

Dx Heaters that fired: All fired at 10a-ps3. (Off, Charge)

QD Plot / Main Magnet Power Status: N/A

Quench Status: 5min Delay File: QDL.D.1053800203 indicated no real quenches.

Cause: Reset of 10a-qd1

Saturday, May 24, 2003

→ **Quench Event:** Yellow, 10a-ps3.A **Time of Event:** 14:18:56 +248158

Beam Permit Fail Time: Already down from previous time at 13:19:36 +1049927.

QPA Cntrl / Timing Resolver: Yellow supplies down / no faults indicated.

QDAlarms: (10a-qd2) appears not to be responding (Condition of readback = Pink).

Postmortems: N/A

Beam Loss Monitors (rads/hr): No beam at the time.

QD Plot / Main Magnet Power Status: N/A

Quench Status: 5min Delay File: QDL.D.1053800336 indicated no real quenches.

Cause: Reset of 10a-qd2

Technical Notes from the Running Logs: 14:25:10: comment by ganetis... Both blue and yellow quench link trips were caused by MCR resetting the 10a-qd1 and 10a-qd2 FEC. Both FEC were down at the same time. Network problems?

***RHIC Physics Run 2002 – 2003, Daily Quench Events
For the month of May 2003***

Saturday, May 24, 2003

Quench Event: Blue, 10a-ps3.A **Time of Event:** 18:10:24 +1398658

Beam Permit Fail Time: Pulled fractions of a second later at 18:10:24 +1398687 (diff +0.000029sec).

QPA Cntrl / Timing Resolver: Blue supplies down / no faults indicated.

QDAlarms: (10a-qd1) appears not to be responding (Condition of readback = Pink).

Postmortems: N/A

Beam Loss Monitors (rads/hr): No beam at the time.

Dx Heaters that fired: All fired at 10a-ps3. (Off, Charge)

QD Plot / Main Magnet Power Status: N/A

Quench Status: 5min Delay File: QDLD.1053814225 indicated no real quenches.

Cause: Reset of 10a-qd1

Technical Notes from the Running Logs: 23:43:08: comment by ganetis... Blue quench link trip was caused by a reset of the 10a-qd1 quench detector. There is no entry in any log that states why this quench detector needed to be reset!

Sunday, May 25, 2003

Permit. , 3c-ps1 dropped {Quench - Snake} Data:

Quench Event: Blue Snake: B03SNK7R2_GL / (Int. 1) **Time of Event:** (Snapshot Time = 05:28:15.933)

QPA Cntrl / Timing Resolver File: 1053854897, no faults listed, QD-bit-3 pulled first.

Snake Power Supply Status: running at operating current of 325.99amps.

Main Magnet Power Status: Dipole, Running at Store Energy of 1941.91amps

Snapshot View: bo3-snk7-2.3 power supply voltage in the time of 5 minutes, shows a steady rise from 8168.91mV to 8272.67mV, an increase of +103.76mV.

QD Plots: Indicate that the voltage tap Bo3-snk7R2_GL was rising and peaked out at 0.251volts at T=zero.

Beam Loss Monitors (rads/hr): No data available at sector 3, beam dump at sector 10 appears good.

Quench Status: (Real)

Quench Event: Blue Snake: bo3-snk7-1.4 / (Int. 5) **Time of Event:** (Snapshot Time = 05:28:19.466)

QPA Cntrl / Timing Resolver File: 1053854900, no faults listed, QD-bit-4 pulled first.

Snake Power Supply Status: running at operating current of 99.98amps.

Snapshot View: No indications of power supply fault.

Time interval between the two snapshot photos approximately: 3.533 seconds.

QD Plots: Voltage taps indicate perturbation (Heat transfer) occurred +3.467sec after the B03SNK7R2 Gas Cooled lead quenched causing bo3-snk7-1.4 to quench.

Quench Status: (Real)

Cause: Gas Cooled Lead Interlock for bo3-snk7-2.3.

Technical Notes from the Running Logs:

05:39:05: comment by gjm... Cryo reports similar flow control problem to that of the other night.

17:38:54: comment by ganetis... First there was a gas cooled lead interlock on bo3-snk7-2.3. This caused the snake magnet to trip and quench. It looks like it is the lead flow controller again. Then 1.24 sec later there were bus quenches at this location that caused the 4b-qd1 quench detector to trip. The yellow quench link tripped because 8b-qd2 got a spike in a 4 to 20 ma current signal for y8-dh0. This spike was not seen in the post mortem plots. There could be a problem with the buffer card for y8-dh0-ps.

NOTE: See the following two Quenches on the next page (page 16) as they are related to this Snake Quench.

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

NOTE: Continued from the previous page (page 15) Snake Quenches.

Sunday, May 25, 2003

Quench Event: Blue, 4b-time.A Time of Event: 05:28:16 +1198731

Beam Permit Fail Time: Pulled fractions of a second later at 02:26:56 +1933660 (diff +0.00003 seconds).

QPA Cntrl / Timing Resolver: y-B1 QLI / no faults indicated.

QDAlarms: (4b-qd1) B3QFBU9_7VT, Int. 5, Tq= -22

Postmortems: No indications that a supply caused the event, bo3-qf8 shows the greatest rate of change in current vs voltage indicating that a quench had occurred.

Beam Loss Monitors (rads/hr): No data available in sector 4, beam dump appears to be normal.

QD Plot / Main Magnet Power Status: Main Quad at Store Energy. Voltage tap B3QFBU9_7VT shows an indication of a slight rise in value.

Quench Status: 5min Delay File: QDLD.1053854897 indicates no real quenches.

Cause: Buss quench (**REAL**)

Technical Notes from the Running Logs: 17:38:54: comment by ganetis... First there was a gas cooled lead interlock on bo3-snk7-2.3. This caused the snake magnet to trip and quench. It looks like it is the lead flow controller again. Then 1.24 sec later there were bus quenches at this location that caused 4b-qd1 quench detector to trip. The yellow quench link tripped because 8b-qd2 got a spike in a 4 to 20 ma current signal for y8-dh0. This spike was not seen in the post mortem plots. There could be a problem with the buffer card for y8-dh0-ps

Sunday, May 25, 2003

Quench Event: Yellow, 8b-ps1 Time of Event: 05:28:16 +1268244

Beam Permit Fail Time: Pulled first at 05:28:12 +3956273 (diff of -4min.).

QPA Cntrl / Timing Resolver: y-QD QLI / no faults indicated.

QDAlarms: (6b-qd2) Y5QFQ6_4VT, Int. 1, Tq= -25
(8b-qd2) Y8DRD0_D0, Int. 1, Tq= -23

Postmortems: Multiple power supplies show an Iref Spike and then some show an Iref Spike and Current Spike all near the same time of -0.0389seconds prior to T=zero. No indications that a power supply was the cause.

Beam Loss Monitors (rads/hr): No significant losses, beam dump appears normal.

QD Plot / Main Magnet Power Status: Main Quad at Store Energy of 1831.21amps, current trips off at -0.033sec prior to T=zero.

Quench Status: 5min Delay File: QDLD.1053854897 indicates no real quenches.

Cause: 4 to 20 ma current spike signal, y8-dh0

Technical Notes from the Running Logs: 17:38:54: comment by ganetis... First there was a gas cooled lead interlock on bo3-snk7-2.3. This caused the snake magnet to trip and quench. It looks like it is the lead flow controller again. Then 1.24 sec later there were bus quenches at this location that caused 4b-qd1 quench detector to trip. The yellow quench link tripped because 8b-qd2 got a spike in a 4 to 20 ma current signal for y8-dh0. This spike was not seen in the post mortem plots. There could be a problem with the buffer card for y8-dh0-ps.

***RHIC Physics Run 2002 – 2003, Daily Quench Events
For the month of May 2003***

Monday, May 26, 2003

Permit. , 9c-ps1 dropped {Quench - Snake} Data:

Quench Event: Blue Snake: bi9-snk7-2.3 / (Int. 1) **Time of Event:** (Snapshot Time = 16:48:19.433)

QPA Cntrl / Timing Resolver File: 1053982102, no faults listed, QD-bit pulled first.

Snake Power Supply Status: running at operating current of 326.41amps.

Main Magnet Power Status: Dipole, Running at Store Energy of 1941.19amps

Snapshot View: No indications that the supply was the cause.

QD Plots:

Beam Loss Monitors (rads/hr): No data available at sector 3, beam dump at sector 10 appears good.

Quench Status: (Real)

Quench Event: Blue Snake: bi9-snk7-1.4 / (Int. 5) **Time of Event:** (Snapshot Time = 16:48:21.433)

QPA Cntrl / Timing Resolver File: 1053982107, no faults listed, QD-bit pulled first.

Snake Power Supply Status: running at operating current of 99.98amps.

Snapshot View: No indications that the supply was the cause.

Time interval between the two snapshot photos approximately: 2.00seconds.

QD Plots: Voltage taps indicate perturbation (Heat transfer) occurred +1.98sec after bi9-snk7-2.3 quenched.

Quench Status: (Real)

Cause: Unknown.

Monday, May 26, 2003

Quench Event: Blue, 10a-ps3.A **Time of Event:** 16:48:20 +454550

Beam Permit Fail Time: Pulled earlier at 16:48:16 +3457980 (diff of -3.00343 seconds).

QPA Cntrl / Timing Resolver: Blue supplies tripped / no faults indicated.

QDAlarms: (10a-qd1) B9QDQ8_VT, Int. 20, Tq= -24

Postmortems: No indications that a supply caused the event.

Beam Loss Monitors (rads/hr): Appeared to be a proper abort, some show pre-spikes but to low of values to cause the event.

QD Plot / Main Magnet Power Status: Main Quad at Store Energy. Voltage tap B9QDQ8_VT begins to decrease in two major steps prior to T=zero then sharply recovers.

Quench Status: 5min Delay File: QDLD.1053982100 indicates no real quenches.

Cause: Buss quench (REAL) due to warm gas from blue 9 snake 2.3 and 1.4 quench.

Technical Notes from the Running Logs: 18:47:59: comment by ganetis... bi9-snk7-2.3 had a real quench. I could not find a cause for this quench. This was not a power supply or gas cooled lead problem. There was no high beam loss. Cryo conditions before the quench look normal. This quench in bi9-snk7-2.3 caused warm gas that quenched bi9-snk7-1.4 and main bus on B9QDQ8_VT in the blue quad circuit.

RHIC Maintenance: 4 hour time slot allowed

Tuesday, May 27, 2003

Quench Event: Blue, 4b-time.A

Time of Event: 08:56:20 +983887

QPA Cntrl / Timing Resolver: b-qtrim-qp pulled / no faults.

Quench Event: Yellow, 4b-time.A

Time of Event: 08:56:24 +2546113

QPA Cntrl / Timing Resolver: y-qtrim-qp pulled / no faults.

Tuesday, May 27, 2003 at 11:30:00 - Back to Physics!

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

Thursday, May 29, 2003

Quench Event: Blue, 5b-ps1 **Time of Event:** 11:02:32 +84779

Beam Permit Fail Time: Pulled fractions of a second later at 10:59:24 +3309132 (diff +3.224353sec).

OPA Cntrl / Timing Resolver: Blue Link down / no faults indicated.

QDAlarms: (5b-qd1) B4DSA4_A3VT, Int. 5, Tq= -24

Postmortems: 1004B show the Blue Main Dipole Oscillating during the transition from Flattop to Ramp Down starting at – 0.1375 prior to tripping off at T=zero.

Beam Loss Monitors (rads/hr): Beam had been aborted at 10:59:27.

Dx Heaters that fired: None fired.

QD Plot / Main Magnet Power Status: Voltage tap B4DSA4_A3VT along with compared taps of B4DSA5_A4VT, B5DSA2_A1VT and B5DSA3_A2VT all show normal response to Ramping down but sharply drop off at –0.1311sec prior to T=zero. This is the same time the Postmortem shows the supply Oscillating as it transitions from Flattop to Ramp down current.

Quench Status: 5min Delay File: QDLD.1054220552 indicated no real quenches.

Cause: Blue Main Dipole Oscillating during transition from Flattop to Ramp down.

Technical Notes from the Running Logs:

12:15:22: comment by TJS... This QLI occurred during a polarization measurement in the yellow ring; there were large losses in the g3-mlmx.4 BLM, rising rapidly to the 3000 mrad/hr level for 200 ms before the quench.

12:22:55: comment by jak... Actually, the beam was aborted at 1059 during Mei's spin flipper exercise. The QLI occurred at 1102, as soon as we told Sequencer to go down. Carl Schultheiss investigated and reported that the QLI is due to a known problem when the mains are issued the down ramp.

Thursday, May 29, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 11:56:48 +740983

Beam Permit Fail Time: Pulled fractions of a second later at 11:56:48 +741013 (diff of +0.00003seconds.).

OPA Cntrl / Timing Resolver: y-QLO / no faults indicated.

QDAlarms: Positive Tq values.

Postmortems: Power supplies not the cause of this event.

Beam Loss Monitors (rads/hr): No significant losses, beam dump appeared normal but lower than usual.

QD Plot / Main Magnet Power Status: Mains running at Injection current.

Quench Status: 5min Delay File: QDLD.1054223808 indicates no real quenches.

Cause: Unknown at this time.

Technical Notes from the Running Logs:

Note: System Recovered but had failed once the Main Supply reached Injection Current.

12:05:31: Yellow quench recovery sequence begun [tape](#)

12:37:15: Beam Abort, 6b-ps1 dropped Yellow Quench [Sequencer](#)

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

Thursday, May 29, 2003

Quench Event: Yellow, 6b-ps1 **Time of Event:** 12:37:12 +1360441

Beam Permit Fail Time: Pulled fractions of a second later at 12:37:12 +1360471 (diff of +0.00003seconds.).

QPA Cntrl / Timing Resolver: y-QLO / no faults indicated.

QDAlarms: Positive Tq values.

Postmortems: Power supplies not the cause of this event.

Beam Loss Monitors (rads/hr): No significant losses, beam had been aborted earlier.

QD Plot / Main Magnet Power Status: Mains running at Injection current.

Quench Status: 5min Delay File: QDLD.1054226233 indicates no real quenches.

Cause: Unknown at this time.

Technical Notes from the Running Logs:

12:48:17: comment by jak... We had a yellow QLI while at injection. We looked at the Postmortem plots and did not see anything suspicious. Carl Schultheiss also looked and reported that the supplies appear to be fine. A second yellow QLI occurred, once injection was reached during the hysteresis ramp. Again, nothing suspicious with the supplies. Wing Louie is investigating to see if a possible cabling issue (or something else) is causing the QLIs.

13:34:14: While trying to recover the yellow quench link again, the link was pulled at 1319. (**NOTE:** No indications on the [Archive List for Quench Summary for the 13:19 QLI.](#)) The recovery script was in the middle of running. [jak](#)

17:00:06: comment by Wing... From the logic analyzer stored data at 1006B. The QLO came down before the QLI. Contacted Rob Michnoff and Ed Koropsak, they suspected maybe the Quench Link carrier fiber receiver located in 1006B or the fiber transmitter at 1005B were intermitting. If the same scenario happens again, then Ed will replace the fiber transceiver board at 1006B and the transceiver board at 1005B.

Friday, May 30, 2003

Permit. , 9c-ps1 dropped {Quench - Snake} Data:

Quench Event: Yellow Snake: yo9-snk7-1.4 / (Int. 1) **Time of Event:** (Snapshot Time = 13:42:41.766)

QPA Cntrl / Timing Resolver File: 1054316563, no faults listed, QD-bit pulled first.

Snake Magnet Power Supply Status: running at operating current of 300.23amps.

Main Magnet Power Status: Yellow Main Dipole running at Injection Current of 473.17amps.

Beam Loss Monitors (rads/hr): yo9-lm7.2-snk=523.869.

Quench Status: **(Real)**

Cause: Beam Induced.

Technical Notes & Comments from the Running Logs: yo9-snk7-2.3 not running due to an internal open lead.

Physics Log: 13:42:45: Beam Abort, 10a-ps3.A dropped {Loss Monitor 1} [Sequencer](#)

MCR Log: 13:42 -- The yo9-snk7-1.4 quenched during beam injection.

Friday, May 30, 2003

Permit. , 9c-ps1 dropped {Quench - Snake} Data:

Quench Event: Yellow Snake: yo9-snk7-1.4 / (Int. 1) **Time of Event:** (Snapshot Time = 15:44:22.600)

QPA Cntrl / Timing Resolver File: 1054323863, no faults listed, QD-bit pulled first.

Snake Magnet Power Supply Status: running at operating current of 300.18amps.

Main Magnet Power Status: Yellow Main Dipole running at Injection Current of 473.17amps.

Beam Loss Monitors (rads/hr): g9-lm8=529.489, yo9-lm7.2-snk=401.100.

Quench Status: **(Real)**

Cause: Beam Induced.

Technical Notes & Comments from the Running Logs: yo9-snk7-2.3 not running due to an internal open lead.

Physics Log: 15:54:10: Beam Abort, 10a-ps3.A dropped {Loss Monitor 1} [Sequencer](#)

MCR Log: 15:55 -- The yo9-snk7-1.4 quenched again when beam was injected into yellow.

RHIC Physics Run 2002 – 2003, Daily Quench Events For the month of May 2003

Friday, May 30, 2003

Permit. , 9c-ps1 dropped {Quench - Snake} Data:

Quench Event: Yellow Snake: yo9-snk7-1.4 / (Int. 1) Time of Event: (Snapshot Time = 16:23:28.033)

QPA Cntrl / Timing Resolver File: 1054326293, no faults listed, QD-bit pulled first.

Snake Magnet Power Supply Status: running at operating current of 300.18amps. (Just completed ramping up)

Main Magnet Power Status: Yellow Main Dipole running at Injection Current of 473.17amps.

Beam Loss Monitors (rads/hr): yo9-lm7.2-snk=268.760.

Quench Status: **(Real)**

Cause: Beam Induced.

Technical Notes & Comments from the Running Logs: yo9-snk7-2.3 not running due to an internal open lead.

Friday, May 30, 2003

Quench Event: Blue, 8b-ps1 Time of Event: 16:53:28 +1843792

Beam Permit Fail Time: Pulled first at 16:53:28 +1750037 (diff +-0.093755sec).

QPA Cntrl / Timing Resolver: Blue-QD, QLI / no faults indicated.

QDAlarms: (8b-qd1) B8QFQ2_VT, Int. 1, Tq= -24

Postmortems: 1008B shows no indications that a Power Supply had caused the quench event. Bi8-qb1, qb2 & qb3 all show signs of a quench taking place as the current and voltage swing opposite directions prior to T=-zero.

Beam Loss Monitors (rads/hr): Sector 7 had one high level radiation, b7-lm3.1=3264.40. Sector 8 had many near the q2, q3 end of the triplet magnet (b8-lm3.1=4918.689) through the warm to cold beam pipe region (b8-lm3.2-c=4698.189, b8-lm3.3-c=4551.939, b8-lm3.5-c=3810.290) to the spin rotators (g8-lm-srt.w=4579.020).

Dx Heaters that fired: None fired.

QD Plot / Main Magnet Power Status: Blue Main Quad running at Store Energy of 1827.35amps. Voltage tap B8QFQ2_VT compared to similar taps had fallen sharply and did not recover in a normal smooth decay recovery slope

Quench Status: **(Real)**, 5min Delay File: QDLD.1054328009 indicated many real quenches at the following, however only one turned out to be real at the following:

(2b-qd1) B1QFQ2_VT, B2QFQ2_VT (Not real, BLM very low)

(4b-qd1) B3QFQ2_VT, B4QFQ2_VT (Not real, BLM very low)

(6b-qd1) B5QFQ2_VT, B6QFQ2_VT (Not real, BLM slight activity of loss at the crossover)

(8b-qd1) B7QFQ2_VT, B8QFQ2_VT (REAL, BLM see notes above)

(10a-qd1) B9QFQ2_VT, B10QFQ2_VT (Not real, BLM Sector 9, low beam in Yellow, Sector 10 dmp, Normal)

(12b-qd1) B11QFQ2_VT, B12QFQ2_VT (Not real, BLM very low)

Cause: Beam Studies, High levels of radiation in Sector 8.

Technical Notes from the Running Logs: 17:21:50: comment by ganetis... Last quench link trip of the run. Blue quench link trip caused by 8b-qd1 quench detector. The quench detector tripped because of a real magnet quench at B8QFQ2- VT. The beam permit tripped .093 sec. before the quench link. There was very high beam loss at this location. There was a real magnet quench at b8q2.

RHIC Summer Shutdown – End of the fy03 Physics Run

Friday, May 30, 2003: 1700 -- The beam studies have ended. The accelerator systems are being turned off.

Blue System Down from previous Quench above: Blue, 8b-ps1

Time of Event: 16:53:28 +1843792

Yellow Quench Event: Yellow, 4b-time.A

Time of Event: 17:12:56 +2490031

QPA Cntrl / Timing Resolver: QP06-R4BOFF2-y-qtrim-qp pulled / no faults.

Physics will return in November!