

***RHIC QLI – Power Supply / Diagnostic Reports for (p[^] Run 2001)
December-10 thru December-16***

Monday: Dec 10, 2001

12:30:38- RHIC acceleration ramp started, ramp id spin2_1007966333 [Sequencer](#)

12:32:13- I think pll stuff debunch yellow, they want to ramp with blue anyway. We try. ..Blue dies at snapback. leif

Monday: Dec 10, 2001, Beam Abort 12a-ps1.A, QLI in Blue ring, 12a-ps1.A (Actual Time 12:31:44 +123259)

QPA Faults: No faults, blue is off.

QD Alarms: All tripped on positive Tq values.

DX Heaters: None fired.

QdRealQuench: None listed.

Postmortems: Indicates that b12-q7-ps Iref dropped -0.007sec before T=0.

Barshow: Monday, Dec. 10 at 12:30:43 shows trouble with the wfg in the Blue Quad Main Power Supply.

Qdplots: BQMC at 524amps, dropped at -0.035sec before T=0.

Beam Loss Monitors: Sectors 9&10 dmp indicate normal (blue) with some levels in the green.

Quench Status: not real

Reason: Problems with the Controls wfg. Comment by MCR: (Jim) -- The Blue Quad current stopped changing early in the ramp, and then jumped up at the time of the QLI. It looks like other power supplies (q89 & dx) ramped but at the wrong time (?) We need to talk to AI.

From the Physics Logs: The PLL apparently caused WFG problems, which in turn caused a Blue Quench Link interlock. 1230: A RHIC ramp was attempted using the PLL. Beam was lost at snapback. The Blue Main Quad Power Supply stopped following the ramp, and many q89 and dx power supplies show a time shift in Pscompare (WFG vs. I). 1245: Although a WFG problem was resolved by rebooting 7c-ps1, still unable to ramp the Yellow Ring magnets to zero. Contacting A. Marusic. 1335: For an unknown reason, Johannes was able to ramp the Yellow magnets back to injection. A. Marusic is investigating the source of the problem. 1340: W. Louie is assisting the MCR with QLI recovery, since it failed on checking the status of the permit link. 1350: Wing was able to run Quench Recovery by bypassing the problem step. AI and Johannes suspect that the PLL was sending erroneous values to some of the WFG's after lock was lost on the previous ramp. AI will modify WFG software, and P. Cameron will modify the PLL software to avoid this problem in the future.

Tuesday: Dec 11, 2001

QLI in Yellow Snake Magnet: YI3-SNK7-1.4-PS (Actual Time 04:32:25)

Qdplots indicate Yellow Auxiliary 2 quenched.

YMDC = 473amps, sitting at injection. YI3-SNK7-1.4 current = 100amps.

Quench Status: Not real

Reason: Looks like the power supply began to shut off around -3.416sec before T=0.

0432 -- The yi3-snk7-1.4 supply indicated that it was off on the AD2000. No beam was in the yellow ring at the time.

QLI in Yellow Snake Magnet: YI3-SNK7-2.3-PS (Actual Time 04:34:10)

Qdplots indicate Yellow Auxiliary 3 quenched.

YMDC = 473amps, sitting at injection. YI3-SNK7-2.3 current = 326amps.

Quench Status: **REAL QUENCH**, coil #2.

Reason: Yellow Snake Magnet: YI3-SNK7-1.4-PS caused it to quench.

0434 -- yi3-snk7-2.3 indicated a quench state on the AD2000.

05:04:54- Cryo phones and reports elevated temperatures. They request we ramp to park, so we do. [Nick L.](#)

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Tuesday: Dec 11, 2001

→ **QLI in Yellow Snake Magnet: YI3-SNK7-1.4-PS (Actual Time 06:07:20)**

YMDC=
Snake power supply current = 0amps
Quench Status: Not Real.
Reason: Snap Shot triggered when MCR ramped to zero.

→ **QLI in Yellow Snake Magnet: YI3-SNK7-2.3-PS (Actual Time 06:14:20)**

YMDC=
Snake power supply current = 0amps
Quench Status: Not Real.
Reason: Snap Shot triggered when MCR ramped to zero.

Tuesday: Dec 11, 2001

→ **QLI in Yellow Snake Magnet: YI3-SNK7-1.4-PS (Actual Time 07:15:31)**

Qdplots indicate Yellow Auxiliary 2 quenched.
YMDC = 473amps, sitting at injection. YI3-SNK7-1.4 current = 100amps.
Quench Status: Not real
Reason: Looks like the power supply began to shut off around -3.416sec before T=0.
0432 -- The yi3-snk7-1.4 supply indicated that it was off on the AD2000. No beam was in the yellow ring at the time.

→ **QLI in Yellow Snake Magnet: YI3-SNK7-2.3-PS (Actual Time 07:15:31)**

Qdplots indicate Yellow Auxiliary 3 quenched.
YMDC = 473amps, sitting at injection. YI3-SNK7-2.3 current = 326amps.
Quench Status: **REAL QUENCH**, coil #2.
Reason: Yellow Snake Magnet: YI3-SNK7-1.4-PS caused it to quench.
0434 -- yi3-snk7-2.3 indicated a quench state on the AD2000.

12:11:03- bi9-tv18 tripped; MCR was able to reset. NOTE: *RHIC corrector power supply bi9-tv18 tripped twice and was reset remotely once. They left it off during the current store.*

2330 -- D. Lowenstein was contacted and informed of the polarization seen in RHIC at gamma=107.

Wednesday: Dec 12, 2001

No Real Power Supply or Quench related problems to report.

23:54:06 comment by...fp -- polarization measurement at injection - lifetime was recovered by reviving bi9-tv18 and by lowering both tunes in blue at injection by 0.003 as they the vertical was getting too close to 0.25.

Thursday: Dec 13, 2001

Maintenance Work

Corrector power supplies **bo3-th8** in Alcove 3C and **bi9-tv18** in Alcove 9B were replaced due to past problems of tripping off. Ac connections were checked on all except the terminal strip in the rack for bo3-th8.

Snake power supplies in 3C and 9C were checked for loose AC connections. Found all of the AC terminal block screws on the back of the AC Power Compartment for Blue Snakes in 3C to be loose. Yellow Snake AC compartment was okay. It appears during installation they were never tightened down all the way, and never showed up during testing. Also the Control Card for **yi3-snk7-1.4-ps** was replaced due to tripping power supply off. Later back at the shop it was proven that the off push button switch was very sensitive and would trip with the slightest movement.

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Modification was done to the QPAIC in Alcove's 3C and 9C so that when the Quench Link for the snakes goes down so will the Permit Link. However, at this time it is in the disabled mode.

Thursday: Dec 13, 2001

Maintenance Work (cont.)

For IR power supply **bo11-qd1**, the 3U chassis was replaced due to a possible connection problem. In the past, this power supply would show noisy error and current signals during ramping. Will continue monitoring as the problem might still be elsewhere such as in the harness, housekeeping power supply or connections between the two.

A new test card (RS-Latch Daughter board modification to a control card) has been placed on bo11-qd1 for testing, (see Don Bruno for additional information).

Three Cooling Air Fans were replaced due to failing, causing ice ball build up on two voltage tap down spouts (blue and yellow ring) triplet magnets at the four O'clock region and one at the DX magnet in the 10 O'clock region.

Thursday: Dec 13, 2001, Beam Abort 12a-ps1.A, QLI in Blue ring, 12a-ps1.A (Actual Time 09:09:40 +577718)

QPA Faults: No faults, blue power supplies off.

QD Alarms: (12a-qd1) only one that tripped, B11QFQ1_VT, Tq=+1813. All others running.

DX Heaters: None fired.

QdRealQuench: Only 12a-qd1 fired with no indications, all others running.

Postmortems: Supplies sitting at zero.

Qdplots: BDMC sitting at zero, B11IMQ1 drops before T=zero.

Beam Loss Monitors: N/A.

Quench Status: not real

Reason: Occurred during maintenance period, Don Bruno sent an "OFF Command" to bo11-qd1 to trip it to the off state and bring down the link.

Beam Abort, 3c-ps1 dropped snake, Yellow 3 o'clock snake quenched.

Thursday: Dec 13, 2001

QLI in Yellow Snake Magnet: YI3-SNK7-2.3-PS (Actual Time 19:54:27)

Snapshot shows the Iref drop before the Current.

Qdplots indicate YMDC2 = 473.45amps, sitting at injection. YI3-SNK7-2.3 current = 326.0amps

V-tap YI3SNK7_2VT goes negative around -0.18167sec.

Quench Status: **REAL QUENCH**, first one to quench.

Reason: Unknown at this time, possible beam induced but there is no data available from the BLM's.

QLI in Yellow Snake Magnet: YI3-SNK7-1.4-PS (Actual Time 19:54:30)

Snapshot shows the Iref drop before the Current.

Qdplots indicate YMDC = 473.45amps, sitting at injection. YI3-SNK7-1.4 current = 99.6amps.

Quench Status: **REAL QUENCH**

Reason: Affected by the YI3-SNK7-2.3 trip as the V-taps show Perturbation -2.60sec before it quenches.

Friday: Dec 14, 2001

05:01:11 comment by...N. Kling -- Blue tunes are periodically shifting across .2 and causing large beam losses at the dumps and at 2 o'clock. It appears **bo3-qd7** is the cause each, time we get these losses a range error alarm appears for this power supply.

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Friday: Dec 14, 2001, Beam Abort 8b-ps1, QLI in Yellow ring, 8b-ps1 (Actual Time 05:20:08 +1434825)

QPA Faults: QP11-R8BD1-y8-dho-qp, FAN Fault, yellow power supplies off.

QD Alarms: All tripped indicating positive Tq values.

DX Heaters: None fired.

QdRealQuench: Many tripped with no indications, all others running.

Postmortems: Nothing unusual at 1008B, main power supplies look okay.

Qdplots: YDMC=1952.36amps, (top energy).

Beam Loss Monitors: Good beam dumps at 9 and 10, minimal loss at 8.

Quench Status: not real

Reason: Fan Fault y8-dho-qp, Filter was changed during the day shift.

06:46:46 and 07:06:12 comment by...Crew -- **bo3-th8** tripped off. This power supply was replaced during maintenance 12/13/01, but the AC connections on the rail in the rack were not checked for tightness. Will require tunnel access if this becomes too much of a problem for MCR. *(Next maintenance period, the AC connections will be checked, the DC connections at the magnet will be checked and the Low Res. Card will be replaced)*

Friday: Dec 14, 2001, QLI in Blue ring, 4b-time.A (Actual Time 10:17:44 +2008920)

QPA Faults: Blue power supplies off, no faults.

QD Alarms: Only 4b-qd1 indicating B3QFQ7_VT; Tq=+1152, all others running.

DX Heaters: None fired.

QdRealQuench: Only 4b-qd1 with no indications.

Qdplots: BQMC=0 amps.

Quench Status: Not Real.

Reason: Shut down for repair work on bo3-qd7. Virtual scope showed that it was oscillating so the current regulator card was replaced. On the current regulator card, the K2 relay was found to be intermitting but the real cause was due to an insufficient (cold) solder joint of the K2 relay to the circuit board.

16:49:48- Trim power supply bo3-th8 continues to trip, affecting rates for all experiments. This will require additional attention during the next maintenance period. *(Next: the AC connections will be checked, the DC connections at the magnet will be checked and the Low Res. Card will be replaced)*

Saturday: Dec 15, 2001: QLI in Blue ring, 8b-ps1 (Actual Time 06:07:52 +71482)

QPA Faults: QP11-R8BD2-b8-dhx-qp (FAN FAULT), all other blues tripped off with no indications.

QD Alarms: All tripped with positive Tq values.

DX Heaters: None fired.

QdRealQuench: None listed.

Postmortems: Indicate nothing unusual.

Qdplots: BDMC=473.4amps, sitting at Injection.

Beam Loss Monitors: N/A

Quench Status: Not Real.

Reason: Fan fault on b8-dhx QPA. Support cycled the power on the b8-dhx QPA.

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Saturday: Dec 15, 2001: QLI in Yellow ring, 5b-ps1 (Actual Time 06:29:04 +2206362)

QPA Faults: N/A

QD Alarms: (5b-qd1) Y5DSA3_A2VT, Tq-24 value. All others tipped indicating positive values.

DX Heaters: None fired.

QdRealQuench: None listed.

Postmortems: Main Power Supplies indicate nothing unusual.

Qdplots: YMDC=473.4amps, sitting at Injection. V-taps show perturbation -3.0seconds prior to tripping.

Beam Loss Monitors: N/A

Quench Status: Not Real

Reason: Yellow QLI because it was not ramped down to zero at the time the blue recovery script was run.

From the Physics Logs: 06:58:23 comment by...crew -- This QLI was due to the magnets not being ramped to zero before running the quench recover script was utilized (which ramps for you at a fast ramp rate). A nice feature that should be added to quench recovery script, would be if the script made a determination as to the location of any link that is up (injection, flattop, etc.) It could then ramp the magnets at the correct ramp rate.

Saturday: Dec 15, 2001: QLI in Blue ring, 8b-ps1 (Actual Time 06:36:12 +2349770)

QPA Faults: QP10-R8BD3-b8-dho-qp (CROWBAR FAULT), both blue and yellow off with no indications.

QD Alarms: None tripped, system running.

DX Heaters: None fired.

QdRealQuench: None listed.

Postmortems: Supplies sitting at Park when bo8-dh0 voltage spikes to the rail causing the crowbar. The bo8-dhx power supply is also affected because it is nested with the bo8-dh0 power supply.

Qdplots: N/A

Beam Loss Monitors: N/A

Quench Status: Not Real.

Reason: Crowbar fault on bo8-dh0 power supply.

From the Physics Logs: 06:59:52 comment by...jak -- Blue QLI during recovery of the first one. The voltage appears to *rail* and the current has moved away from the current reference.

Saturday: Dec 15, 2001: QLI in Blue ring, 8b-ps1 (Actual Time 07:32:16 +3774562)

QPA Faults: QP11-R8BD2-b8-dhx-qp (FAN FAULT), all other blues tripped off with no indications.

QD Alarms: All tripped indicating positive Tq values.

DX Heaters: None fired.

QdRealQuench: None listed.

Postmortems: Indicate nothing unusual.

Qdplots: Sitting at Injection,

Beam Loss Monitors: N/A

Quench Status:

Reason: Fan fault on b8-dhx QPA. This time support cleaned the air filter and actuated the quench switches. These switches have been known to build up an internal resistance causing a fault. In the past it has been found that by cycling them several times it cleans the internal contacts.

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Sunday: Dec 16, 2001

(For Information Only: definition of the SPIN FLIPPER)

1355: M. Bai is running the Blue "spin flipper" (aka the RHIC AC Dipole).

Sunday: Dec 16, 2001:

▶ **Beam Abort, 3c-ps1 dropped snake, QLI in Blue Snake Magnet: bo3-snk7-2.3-ps (Actual Time 15:42:41)**

Qdplots indicate Blue Auxiliary 1 quenched.

BMDC =473.4 amps, sitting at Injection. BO3-SNK7-2.3 current =319.7amps

Qdplots: Show V-tap BO3SNK7_3VT goes negative before T= Zero.

Beam Loss Monitors: Indicate several losses around Sector 3 at b3-1m7.1-snk (450r/h), g3-1m7 (950r/h), g3-1m6 (425r/h) and y3-1m7.1-snk (400r/h). Sector 10, b10-1m3.3-ka (3000r/h), the dmp's are all in the green.

Quench Status: **REAL QUENCH**

Reason: Possible beam induced.

▶ **Beam Abort, 3c-ps1 dropped snake, QLI in Blue Snake Magnet: bo3-snk7-1.4-ps (Actual Time 15:44:03)**

Qdplots indicate Blue Auxiliary 0 quenched.

BMDC =473.4 amps, sitting at Injection. BO3-SNK7-1.4 current =70.3amps

Qdplots: V-taps do not indicate that Perturbation took place.

Beam Loss Monitors: (See above)

Quench Status: Not Real.

Reason: Permit Link went down due to Quench on bo3-snk7-2.3

From the Physics Logs: Development off. Snake bo3-snk7 quenched while ramping it with 55 bunches at injection with the spin flipper turned on. 15:53:27 comment by...Mei -- The snake bo3-snk quenched right after we ramped the outer current to 70.5A and inner current to 320A to get spin tune 0.47 for another try of spin flipper. The blm postmortem data shows the quench could be caused by the beam.

16:32:34- Beam Abort, 10a-ps3.A dropped {Loss Monitor 1}

Sunday: Dec 16, 2001:

▶ **Beam Abort, QLI in 9C Blue Snake Magnet: bi9-snk7-2.3-ps (Actual Time 16:32:29)**

Qdplots indicate Blue Auxiliary 1 quenched.

BMDC =473.4amps, sitting at Injection. BI9-SNK7-2.3 current =326.2amps.

Qdplots: Show V-tap BI9SNK7_3VT goes negative before T= Zero.

Beam Loss Monitors: Sector 9, show high loss around 2000rads/hr at y9 and b9 snakes.

Quench Status: **REAL QUENCH**

Reason: Beam Induced.

▶ **Beam Abort, QLI in 9C Blue Snake Magnet: bi9-snk7-1.4-ps (Actual Time 16:32:32)**

Qdplots indicate Blue Auxiliary 0 quenched.

BMDC =473.4amps, sitting at Injection. BI9-SNK7-1.4 current = 100.26amps.

Qdplots: Affected by the bi9-snk7-2.3 trip as the two V-taps show Perturbation -2.6sec before it quenches.

Beam Loss Monitors: (See above)

Quench Status: **REAL QUENCH**

Reason: Caused by bi9-snk7-2.3.

From the Physics Logs: 1632: Development off. Both Blue snakes quenched while kicking with the spin flipper.

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Sunday: Dec 16, 2001:

▶ **Beam Abort, QLI in 3C Blue Snake Magnet: bo3-snk7-2.3-ps (Actual Time 16:32:29)**

Qdplots indicate Blue Auxiliary 1 quenched.
BMDC =473.4amps, sitting at Injection. BO3-SNK7-2.3 current =325.9amps.
Qdplots: Indicate V-tap BO3SNK7_3VT goes negative before T= Zero.
Beam Loss Monitors: N/A
Quench Status: **REAL QUENCH**
Reason: Beam Induced.

▶ **Beam Abort, QLI in 3C Blue Snake Magnet: bo3-snk7-1.4-ps (Actual Time 16:32:32)**

Qdplots indicate Blue Auxiliary 0 quenched.
BMDC =473.4amps, sitting at Injection. BO3-SNK7-1.4 current = 99.6amps.
Qdplots: Affected by the bo3-snk7-2.3 trip as the two V-taps show Perturbation -3.7sec before it quenches.
Beam Loss Monitors: N/A
Quench Status: **REAL QUENCH**
Reason: Caused by the bo3-snk7-2.3 Quench.

From the Physics Logs: 16:54:27 comment by...waldo -- losses at sector three. Note the ac dipole pulse showing up on some loss monitors. Some of the loss signals are going negative!?! Clearly the second ac dipole pulse was stronger and nailed both snakes in the blue ring. It was fortuitous that we did not have beam in the yellow ring. Somehow I don't think we want to depolarize the beam by blowing it out of the machine.

17:01:35 comment by...waldo -- Losses in sector nine showing how we nailed that snake with the beam as well.