MICE Running April 2014

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Summary of Shifts

4th April: Target Double Dip Rate Commissioning: Hall preparation
5th April: Target Double Dip Rate Commissioning: Full running

Shift Description

4th April 2014

Crew: MOM - A. Dobbs, BLOC - H. Nebrensky

Purpose: Preparing hall for tomorrow's run

Report:

- Conventional magnet checklist actions completed and magnets briefly powered
- Cranes not moved from E end of Hall – standing requirement prior to search
- Hall search completed, and checked hall search would not trip if auxiliary doors were shaken without shoot-bolt in place - test failed, issue has since been addressed by addition of the large upper bolt and requirement to use remaining shoot-bolt.
- During subsequent research, ISIS staff wandered into hall ignoring no entry sign. Not good, but understandable - sign is low down and not prominent during search phase. Suggested solutions:
    - Close Outer Door during final search, making signage visible – added to PPS User Guide
    - Increase sign prominence
    - Post someone on main hall door during search
- PPS "BEAM IMMINENT" sign flickered continually, and sounders never switched off. HN performed a controlled access and correctly set the PPS Test Select switch back to Blue, not BOBs. Subsequently got Muon Beam Permit without problem. Not clear who changed Test Switch or why.
- ISIS required subsequent access to hall for work on chopper power supply, so left hall open
- ISIS engineer reported Hall phone at Q4 PSU not working. Restarted base unit by Equipment Door.

5th April 2014

Crew: MOM - A. Dobbs, BLOC - H. Nebrensky, Shifters - E. Overton, Y. Karadzhov

Purpose: Commissioning the target at double dip rate

Report:

- First controlled entry of the day not performed according to standard procedure. Didn't cause a problem, but worth emphasizing the importance of remembering to use the checklists.

- Began with target at standard rate (MS/128). ISIS running in an unusual mode, with only the MICE spill actually circulating in the ring
- Needed to lower target user delay from 12.60 to 11.60 ms, giving nice flat top beam loss profile 12.60 ms was our standard value previously
- Target coil temps all fine, 45-50 °C
- Progressively larger variance seen in network beam loss display and live wall screen display as higher losses reached. Not surprising from past experience, though Dean unhappy with his systems. Wall bar chart recommended as preferred method, as closer matches ISIS control room. Resolving this discrepancy within ISIS' systems is the specific reason for the June BLM run.
- Large pulse to pulse variance at higher losses, e.g. varying between 2 and 6 volts for a 31.55 mm BCD. Again, annoying but not surprising.
- Low trigger rate observed in DAQ – D1 off and beam stop closed. Illustrates the importance of checklists and following them.
- Switched to new double dip target rate (MS/64) – running seems perfect
- Dip rate measured as 0.781Hz on scope
- User delay required further reduction to 11.40 ms, then 11.10 ms
- Target coils running hotter 58-65 °C, but within tolerances
- Mid spill early beam loss peak more pronounced, but still negligible, see Fig. 1
- Stopped target and allowed it to cool (giving faster acceleration) and confirmed that its entry into beam on restart didn't cause unacceptable losses early in spill
- Made target delay 20 ms earlier to test whether we would scrape next ISIS spill – no extra losses seen, ISIS happy that all is well (see Figs 2 and 3)
- Ran 2 mins at MS/128 ~8V 11.40 ms delay, up to 30.45 BCD
    - Measured VME readout time per particle trigger. Max time was 116ms, with ~100 particles per spill max.
    - By extrapolation, from DAQ side one could reach 500 triggers/spill @ MS/64
- Target RATS daemon crashed, possible issues with the National Instruments card
- Target optical readout steady – no signs of degradation
- Beam stop juddering and wouldn't close fully – switched later to backup power pack and system serviced

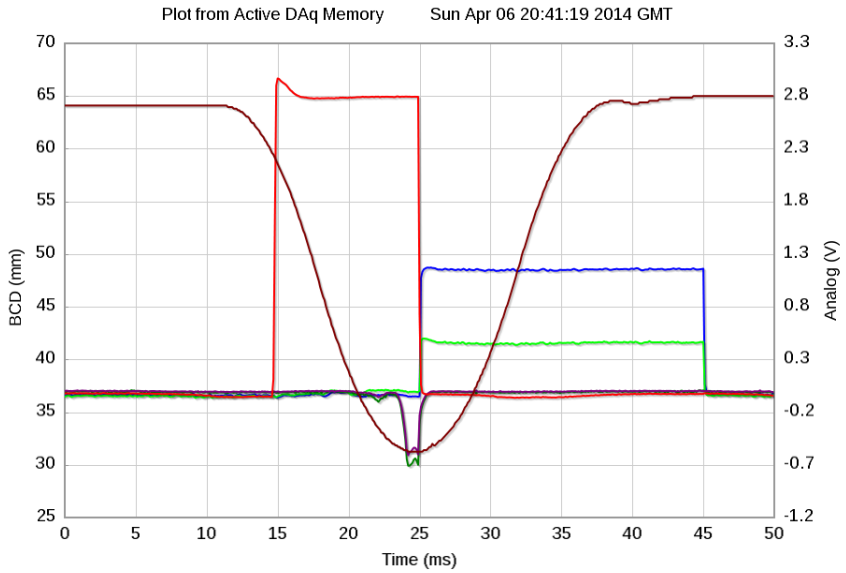

Figure 1 Double rate dip at 4V beam loss

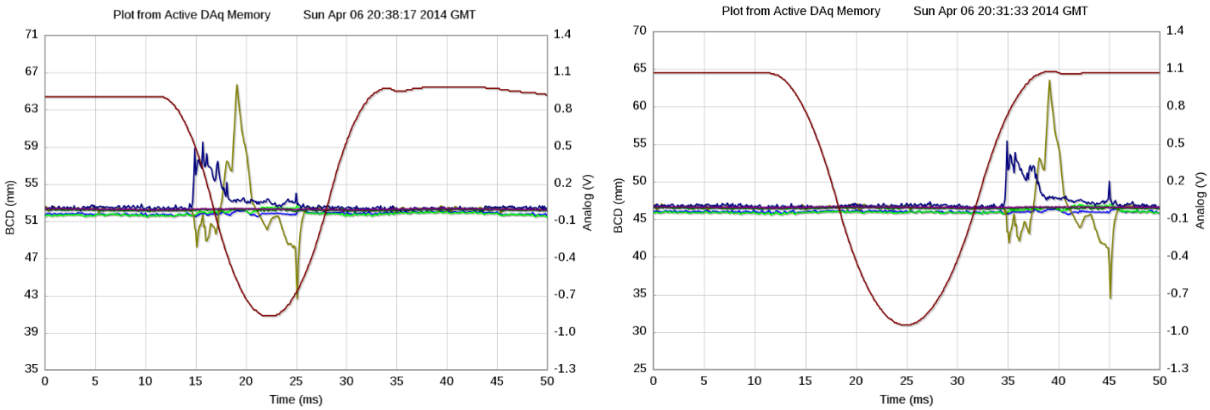

Figure 2 Left: Beam loss display with usual delay Right: Dip with 20 ms less delay, dipping into a "virtual" spill – no extra losses seen, indicating no scraping on next spill

Summary of Findings

- Target worked superbly at new increased rate
- Guard main hall door when performing search
- Emphasise need to follow checklists
- Use wall beam loss display as canonical measure