PVDIS Run Plan: Oct - Dec, 2009

Overall

- Run plans are executed by the Run Coordinator.
- All changes need explicit approval from the Run Coordinator.
- Make sure spectrometers and target are surveyed before the commissioning starts.
- Check start-of-run and end-of-run CODA log entry. Make sure the comment and other info are ok.
- Is the online replay ready?

Daily Counting house 2nd floor meeting (3 PM) to discuss:

1. major problems during the last three shifts.
2. completed part of the run plan, did we miss anything ?
3. run plan of the next day. Next major changes.

Analysis meeting (daily during commissioning, and as frequent as needed during production)
(starts around 3:30 pm in counting house upstairs (after 3 PM meeting) to discuss the following:)

1. status of online software, new variables to add, major changes.
2. on going calibration, new tasks of data analysis.
3. data quality control, update of online standard histograms.
4. expert-shifts for data quality control.

- A Moller measurement every week (or after major injector changes),prefer two back-to-back Moller measurements before and after the beam half wave plate changes.

Startup Procedure: Beam delivery checkout with x-pass beam:
This procedure is required for every long period (>2hrs) of absence of beam.

- Beam energy lock: ON Hall A.
- Fast feedback lock: ON
- Target: empty or BeO as needed.
- Beam entrance and exit window cover OUT.

- Beam tune straight, not through Compton magnets.
- Verify settings of target Ion chamber trip limit (MCC with Radcon).
- Center beam on the BeO target's cross mark. Record BPM A and B readings in (x, y).
- Ask for harp scan, require that beam σ_x: 100 - 300 μm, σ_y:100 - 300 μm on two hall A harps.
- Establish the beam position on the target, use a carbon-hole target to determine a proper raster size (in both MCC and hall units) by a raster scan. Follow the following steps for the raster scan. Ask for 2μA beam and change the raster size according to the following steps, check the trigger rates on scaler (record them and halog), take CODA runs, do spot^{++} (halog the spot^{++} plots), find out carbon hole in spot^{++} (halog it).
  1. 2 mm x 2 mm raster
  2. 3 mm x 3 mm raster
  3. 4 mm x 4 mm raster
  4. 5 mm x 5 mm raster
  5. Change the raster size in increasing steps until rates go a dramatically high value. If the beam hits a target frame, the rate will shoot up.
- If the rate on each raster size is the same in above 4 steps, we can take beam for commissioning (or production). Ask for the raster size so as to get the beam of size 3 mm x 3 mm on target. Make sure the carbon-hole appears in the middle of the raster pattern. If not, coordinate with MCC to change the BPM positions so as to put it in the center of the raster pattern. [Raster ON is required to see the hole, no raster, no hole. To see a better hole, use a clock trigger (T8), prescale away physics triggers.]
- Check signals from lumi-monitors, beam position monitors, beam charge monitors.
- Lumi readings can be clearly lined up with real triggers in time ? Fast clock serves as a time mark.
- Happex beam charge feedback check.

Commissioning

- 1-pass beam.
- Finish "Startup Procedure" if not done already.
- Check detectors of both HRSs including VDCs. Make sure all ADC and TDC signals are there and make sense. Are ADC and TDC signals of S1, S2, Gas-cherenkov, shower, preshower, VDCs ok?

- Check timing of all PVDIS signals in the flow-chart diagram of the PVDIS DAQ flow-chart such that the timing make sense (i.e. signals are coincident at the point where they meet).

- Optics, Q^2 measurement "along with pointing" with water cell target immediately after Happex [Nilanga].

- $* * * * * * *$ Pass change to 5-pass $* * * * * * *$

Production

- Finish "Startup Procedure".

- Remember to cycle quads (Q2 and Q3 only) when going from lower momentum to higher momentum (no need to cycle them when going from higher to lower momentum).

- Q^2 measurements (not less than 1 per week)[Need to post procedure here]

- Absolute BCM calibration (1 in mid. Nov, 1 in Dec)[BCM calibration procedure given below]

- BPM fixed-gain calibration (not less than 1 in three weeks) [Procedure for Bull's eye scan given below]

- Mini-spin dance to check transverse polarization (as needed)

- Rescattering radiative tail cross-section study

- Beam energy measurement (1 time for 5-pass)

- Dummy Al Target background study (at least 2 times)

- Warm cryo-cell Aluminum background study

- Transverse Asymmetry study? [Not sure what is this, copied from Kent Paschke's plan]

- Target Boiling test [how often? Twice? Also needs a precedure].

- Bull's eye scan (2 times) [procedure given below].

- A frequent low and high current tests to see rate, deadtime, etc. [may be every other day] [make a detail plan].

- Need to do spectrometer detector test by turning ON detectors including VDCs for calibration purpose (be specific which calibration?). [make a detail plan].

BCM calibration Procedure (i.e. BCM Linearity Test):

There are two types of BCM calibrations. The first is “BCM Linearity Test”, the second is “Cross Calibrating the OL02 BCM with FC#2”. Both of these procedures are invassive. We do the first here. You must coordinate with MCC. Let the Program Deputy and MCC know that we are going to do a BCM calibration. Since other halls will not get beam during this procedure, they need to be notified and coordinated through the Run Cordinator.

- Find the BCM Logging GUI beforehand and make sure it works. It should be at “Hall A Main Menu → BCM → BCM Logging”
- The machine is set-up in ”no-loss” mode: this allows people to believe that all the current that gets out of the injector region makes it past the BCMs in Hall A. The following procedure is then followed:
  - Hall A must have empty target.
  - Ask MCC to get ready and call you back before starting the procedure. From here the procedure is invassive (no other halls can get beam). MCC will make sure about this.
  - When they call: start both HRSs CODA runs, start logging the current monitor DVM data (from the Hall A Tools menu).
    1. Current = 100 uA. MCC does the following first three items.
    2. The Faraday cup is inserted at the end of the injector region to measure an absolute current for about 90 s. Hall A will not see beam current during this time.
    3. Faraday cup is removed for about 90 s. Hall A will see beam current during this time.
    4. Cross calibrate the 0L02 cavity monitor with the Faraday cup data.
    5. Cross calibrate Hall A BCMs at the same time (via CODA data and the DVM logging).
    6. Repeat steps 2 to 4 for these beam currents: 50, 20, 10, 5, 2, 1 uA
    7. Check Lumi data to see if counts scale with beam current.
- When all this is done, stop the CODA runs and the Logger. Halog the CODA run numbers and the BCM logging filename (which only updates after you hit stop). There should not be any beam trip between the start to stop of the logging period. If it does, you should abort the process. The whole thing usually involves a 2 hours of downtime for all Halls though the official time for this procedure is about 1 hour.
- After offline analysis, update BCM conversion factors in Hall A Tools (coordinate this with the Run Coordinator, do not do before the Run Coordinator allows you to implement these calibration constants).

Bull's Eye Scan Procedure: This is required for beam position calibration.Once the beam position is established by doing raster scan on a carbon-hole target so as to see the hole at the center of the raster pattern, do this Bull's eye scan.

- Target: carbon hole target.
- Beam current: < 5 uA. Beam raster: ON. [Raster ON is required to see the hole, no raster, no hole. To see a better hole, use a clock trigger (T8), prescale away physics triggers.]
- Take both HRS CODA runs. Establish the center of the target by doing raster scan and seeing the hole and centering it.
- Start of Bull's eye scan
- One run at the nominal beam center as established above.
- One run at (x,y) of both BPM A and B at (+3.0, +3.0). (if it takes more than 5-10 minutes for MCC to set it up, settle with (+2.5, +2.5) or lower values)
- One run at (x,y) of both BPM A and B at (+3.0, -3.0).
- One run at (x,y) of both BPM A and B at (-3.0, -3.0).
- One run at (x,y) of both BPM A and B at (-3.0, +3.0).
- Make a halog entry saying wich runs correspond to which conditions.
- End of Bull's eye scan

Daily Plan

- Oct 30
  1.
  2.
  3.
- Oct 31
  1.
  2.
  3.