LHC Beam Operation Committee

Notes from the meeting held on 22nd November 2011

Participants

1. BE-CO work during TS – P. Charrue (slides)

P. Charrue presented the changes performed by CO during the last technical stop (5th TS). Almost all the interventions planned and presented during the previous LBOC meeting were accomplished and verified (see slides for details). Only pending actions are: new release of cmw-rda Java libraries and SPS timing; they will be performed during winter TS.
P. Charrue announced the decision of CO about new versions of LINUX and JAVA for 2012. Scientific LINUX SLC6-64bit will work on all the operational consoles and SLC5-32bit on all back-end servers. JAVA6 will remain the operational JAVA platform everywhere. The upgrade to JAVA 7 will not be implemented before LS1 (2013/2014) since it is too risky and with small benefits. CO will not provide support to JAVA7 before that date. Four consoles are already configured with the new SLC6-64bit in the CCC and people are encouraged to check software and GUI on these machines and report about eventual problems.

Discussion:

J. Wennninger asked M. Solfaroli when first powering tests will be performed during LS1.
M. Solfaroli: answered that these tests should start 6 months before the end of LS1.
J. Wenninger pointed out that new CO infrastructure should be operational for that date.
P.Charrue answered that, as the injectors will have a 'normal' startup in 2014, the controls infrastructure will be operational beginning of 2014.

2. Movements of the Low Beta Quadrupoles– D. Missiaen (slides)

D. Missiaen presented triplet alignment measurements and their evolution in time (from 2009 for IR1 and IR5, 2010 for IR2 and IR8). He described the water network system used to measure vertical position and roll angle of the magnets: hydrostatic leveling with reference points, in the cavern, which are considered fixed (relative measurements). He showed that the variations in all the IRs are of the order of few tenths of mm in the vertical positions and few tenths of mrad in the roll angle. IR5 and IR8 were realigned in January/February 2011. IR5 did not move since then, while movements are observed at the left side of IR8, on Q2R1(+0.7mm) and Q1R2 (+0.5mm).
Transverse position is measured with a system of INVAR rods and sensors. For IR1 and IR5 a system of galleries allows to use, as reference, fixed points in the cavern. For the remaining IRs, independent sensors have been installed on Q1 and Q3.

Again, variations are of the order of few tenths of mm. The worst situation is observed in IR1 where magnets are rotated and a continuous degradation is observed.
D. Missiaen pointed out that absolute measurements will be done during the winter TS and no alignment will be performed before the measurements.

Discussion:

J.Wenninger commented that a higher coupling is measured in IR2, and a bigger roll angle was expected at this location.
M. Giovannozzi replied that D1 could be the origin of the problem and it would be interesting to monitor coupling during the inversion of the vertical crossing angle in ALICE. This will be performed in the next days as an end of fill study.

J. Wenninger concluded that required changes in triplet alignment are extremely small and they fall in the noise of orbit corrections: no need of triplet realignment during Winter TS. He added that the two transfer lines should instead be re-measured.
D. Missiaen commented that TI2 and TI8 vertical position will be indeed checked.

3. IR2 Aperture Measurements – G. Mueller (slides)

G. Mueller showed the results of IR2 aperture measurements, which were performed before ion commissioning. Two configurations, with 1 m β^* and ± 0.7 mm, were used: -80 μrad and +120 μrad crossing angle. Triplet aperture was measured relatively to the TCT aperture (see slides for detailed method description). An abnormal loss sequence was observed in the vertical plane: losses did not move from the TCT to the triplet, as expected, but fell at another location near the TCT. This happened for both beams during the first measurement (-80 μrad) and only for Beam 1 during the second measurement (+120 μrad) after the retraction of the TCDD. No obstacles, reducing the available aperture, where found by X-Rays scan. Simulation where performed to check the shape of the knobs used to generate the local orbit bump at the triplet. Comparison between the interpolated (from BPM reading) and simulated orbit showed a reasonable agreement in the vertical plane while a systematic 2-3 mm offset affects the horizontal plane. Reliability of the BPMs at this location has to be verified. Aperture was measured to be between 15.5 σ and 16.5 σ in both planes and for both beams for -80 μrad crossing angle. Only vertical plane was measured for the 120 μrad case; aperture is 12.5-13σ for Beam 1 and 15-15.5σ for Beam 2.

Discussion:

J. Wenninger asked D.Missiaen to perform position measurements at the location of the BPMs which show the systematic offset.

M. Giovannozzi commented that it is not possible to exclude the presence of an aperture bottleneck just with X-Rays analysis.

D. Missiaen added that vacuum chamber flanges with an offset of 12 mm were found in that region.
M. Giovannozzi: replied that this is the case at the location of the Y vacuum chamber but that the aperture is by far too big to be sensitive to this offset. Losses are really in the region of the TCT and problems with vacuum are also observed there.
B. Dehning mentioned that additional BLMs will be installed in the critical region next Friday (26th November).

4. Next meeting

Tuesday, 29th November: **LBOC meeting (15:30 in 874-1-011)**.
Thursday, 8th December: **LSWG meeting (09:00 in 030-7-010)**.