SUMMARY OF SESSION 6: PLANNING AND PREPARATION FOR 2014-2015

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Abstract

Session number six focused on the planning and preparation work being carried out during 2014 and that will continue in 2015 in view of beam commissioning. This paper reports on the discussions held during the session.

POWERING TESTS - MACHINE STATUS COMING OUT OF LS1
M. Solfaroli and M. Pojer

Matteo explained that a Free Wheel Thyristor on the output of RB power converters has been installed to reduce the 30 Hz voltage oscillations (ERC 1387235). It will be connected and tested on the first sector that will undergo powering test, and according to the results a decision will be taken in order to use it or not. Wolfgang Hofle asked if there would be any impact on the beam due to this frequency. Matteo said that 30 Hz voltage oscillations only arrive after a fast power abort, and there is no beam in the machine by then.

Jan Uythoven asked if the problem of the feedback tripping the RQTs (tune trim quadrupole circuit) has been solved for RUN 2 (Note: the tune feedback applies only small changes in current but the dV/dt (d2I/dt2) in combination with the parallel resistors creates a voltage rise that QPS cannot distinguish from a real quench). Reiner Denz answered that for RUN 2 the thresholds are being revisited and they will be possibly increased, but if the feedback requires too much, the system, in the end, will not be able to cope with.

Paul Collier asked if time would be dedicated to train the RD3.L4 (single aperture superconducting separation dipole circuit left of IR4) to 7 TeV. Matteo answered that it depends on MP3 but it is believed it can reach nominal values.

Freddy Bordry recalled that the energy in 2015 will not be larger than 6.5 TeV and that only in December 2014 we will know if the energy at which LHC will be operated needs to be lower.

Mike Lamont asked if the 30 A limit on the RCO (octupole spool piece circuit) can be removed. Matteo said that it is possible but needs an intervention that has to be explicitly requested. Mike said that, in this case, he will do the formal request.

Stephan Fartoukh asked if for RCBYHS5.R8B1 (horizontal crossing angle orbit corrector circuit right of IP8 for B1) the dI/dt could be reduced in order to get more Imax, which is the real constraint in order to push the crossing angle. Arjan Verweij replied that it can be done if there is a real need for improving performance, but it is a weak magnet and they prefer to leave a safety margin.

DRY RUNS AND MACHINE CHECKOUT STRATEGY
M. Albert and R. Giachino

A huge amount of work will be, very soon, in the hands of the operation team: they will have to cover shift for powering test, they will have to dry run the complete accelerator control system and perform a thorough cold-checkout of the machine before first beam. Mike asked if BE/OP/LHC has the resources to cover all this work. Markus answered that he is currently preparing the shift plan and seems should be possible. Operations is encouraged to participate in the dry runs since this is a unique opportunity to re-learn how to operate LHC again, which has changed quite a bit.

SECTOR TESTS WITH BEAM, POSSIBLE TRANSFER LINE TESTS WITH BEAM
V. Kain and R. Alemany

Stefano Redaelli asked if it makes sense to do a B2 sector test if it might not be possible to perform a cycle at high energy of sector 78 which seems to be in the critical path in what concerns powering test phase II. Mike answered that many of the tests presented in the slides do not require an accurate knowledge of the higher order multipoles of the magnets. Reyes added that the sector tests would in any case be of crucial importance to detect aperture bottlenecks, establish synchronization with SPS, detect magnet and BPM polarity errors, first setup of the injection and dump region, injection kickers wave form study, etc.

OMC IMPROVEMENTS AND PROSPECTS FOR 2015
A. S. Langner

Andy gave the estimate of the beta beat errors for 2015, before corrections, for both beams: 100% for B1 and 140% for B2. Roderik Bruce asked if Andy could give some estimation on what the beta beat error will be after correction since this is crucial for collimator hierarchy and beta* reach estimation. Andy answered it is very difficult to give such a number, but, of course, should be either the same or better.

Andy gave as well a detailed description of the improvement that can be achieved if MCS, MCO and MCD correctors (sextupole, octupole and decapole spool piece circuits) are used to reduce the higher multipole errors contribution of the arc dipoles. Rudiger asked what the effect on the beam will be if we use them. Rogelio answered that the most important contribution comes from MCO for amplitude detuning at injection since it is a critical parameter for instabilities control.

According to Andy, during the squeeze the field errors in the triplets are the main source of uncertainty in the optics and, naturally, it is the job of the triplet corrector magnets to correct them. Ezio asked if Andy plans to do measurements to correct the optics with the non-linear correctors of the triplets. Andy answered that until 60 cm beta* they do not have any influence, but below that value yes, so measurements will be needed.

Andrzej Siemko asked the status of the understanding of the snapback model and what the strategy will be for RUN 2 taking into account that from 4 to 6.5 TeV there is 40% more snapback contribution. Mike answered that to start with, the same strategy as in RUN 1 will be applied, i.e., chromaticity correction at the start of the ramp will be feed forwarded in the functions based on dedicated measurements during the ramp. Ezio strengthened that all measurements will have to be done for the new energy.

STRATEGY FOR FIRST TWO MONTHS AND KEY EARLY MEASUREMENTS

S. Redaelli

Wolfgang Hofle asked if OP plans to write dedicated procedures for beam commissioning as those which were prepared in 2008. They are very useful for the equipment experts to know exactly when they should be available for commissioning their equipment with beam. Verena Kain replied that OP will prepare soon a detailed plan but not a commissioning document as was done in 2008.

Paul Collier made the remark that we should not put ourselves in a corner being too ambitious in reaching the highest performance possible since the beginning. We should start at a relaxed beta*, prepare the land, and then, in due time, push for more performance.

Stephan Fartoukh asked if besides the asynchronous dump tests, there are other tests related to machine protection that need to be done before we can change the beta*. Stefano replied negatively, but in any case, the asynchronous dump test does not depend on the beta* provided the phase advance between TCTs (tertiary collimators) and TCDQs (mobile diluter that protects the superconducting quadrupole immediately downstream of the extraction as well as the arc at injection energy and the triplet aperture at top energy from bunches with small impact parameters) stays constant. Brennan Goddard said that for validating the ATS-compatible optics proposed by Stephan, where a change in phase advance between the TCTs and TCDQs is foreseen, he would like to test asynchronous dumps with different values of the retraction of the collimators involved.