

# Beam Commissioning Working Group

Minutes for 14 December 2018

**Present:** V. Kain, G. Rumolo, S. Albright, F. Antoniou, H. Bartosik, D. Cotte, H. Damerau, M. Fraser, G. P. Di Giovanni, M. Gourber-Pace, K. Hanke, A. Huschauer, A. Lasheen, K. Li, B. Mikulec, G. Papotti, F. Tecker, F. Velotti

## Meeting objectives

Presentation and discussion of PS beam commissioning schedule.

## Approval of Minutes and Matters Arising - V. Kain

The minutes of the 23<sup>rd</sup> of November are accepted without comment.

## PS Beam Commissioning Schedule - F. Tecker

### *Presentation*

- Six weeks of beam commissioning are foreseen for the PS, broken by the two week Christmas shutdown. The intention over Christmas is to keep services running and not do a lockout to minimise the disruption, some impact is still expected.
- Beams to be commissioned in an order defined using SPS requirements, starting with LHCIN-DIV then low-intensity MTE, others will follow during and after the six weeks of commissioning.
- At high energies there are only three orbit correctors available, so magnet realignment will be essential in the first weeks. A second main magnet realignment may be required later in commissioning when fine tuning the extraction.
- There is a request to have beam commissioning coordinators on normal working hours, rather than shifts, during the first six weeks to improve communication with equipment groups.
- The scheduled time is expected to be sufficient if there are no significant problems.

### *Discussion*

- B. Mikulec asks if it is possible to test the EIS in advance. V. Kain gives the SPS as an example where they test one device and use another upstream element to protect the target zone. B. Mikulec says it should be further discussed with EPC to find out how much testing can be done in advance.
- B. Mikulec asks about the use of external conditions in the PS, there are ongoing discussions with EPC who want to them implemented in software, whereas there is a lot of hard-wired ones in the PS. V. Kain suggests it might be worth looking at setting up a BIS for the PS and connecting the PS interlocks to that, F. Tecker thinks that would be difficult. B. Mikulec says that to have external conditions hard wired to the power converters will require a strong argument to be made so should be discussed in the future. V. Kain agrees and

suggests having a discussion on external conditions in general in a different setting, for the EIS systems specifically they could be discussed as part of this working group.

- H. Damerau asks what extraction field should be chosen for the PSB, due to the 200 MHz RF system there are discrete allowed values for the PS injection field. B. Mikulec requests information from the PS on their requirements so it can be checked for suitability in the PSB.
- M. Gourber-Pace asks about the PPM switching for the new and old RF controls and if there are any specific CO requirements. H. Damerau says the only requirement is for some pulse repeaters, which has already been organised.
- A. Huschauer, questions if the week four schedule is reasonable due to lost days for Christmas, F. Tecker says it is expected there may be some delay to after Christmas as a result.
- V. Kain says that in the SPS they have found it beneficial to define golden orbits and golden trajectories early on as a reference point in case of certain problems. F. Tecker and G. P. di Giovanni say they will have the references from the end of 2018. H. Bartosik asks if in operation there is typically a defined reference orbit, G. P. di Giovanni says no. V. Kain says they used to operate the same way in the SPS, but when they defined an ideal reference orbit and injection trajectory it made future set up and debugging easier.
- V. Kain asks about the new tools for correcting  $Q$  and  $\xi$  and if it is known in advance how they should be optimised for e.g. transition crossing. A. Huschauer says this is not known to be ideal at present and requires significant work for each cycle, but they have reference measurements for each cycle so can use these as a starting point after LS2. Additionally for  $Q$  there are canonical values, but for  $\xi$  it requires high intensity anyway so this is a more long term objective.
- F. Tecker points out that the schedule requires a very rapid restart of the low energy machines after Christmas, V Kain suggests it require an AMS like restart. B. Mikulec says this needs to be discussed in detail because it may require piquet service and similar over the Christmas break, V. Kain agrees.
- V. Kain asks if anything is missing in terms of measurements that are not usually done but should be. A. Huschauer thinks not, but the main change is the injection region and this is expected to be measured as required.
- D. Cotte suggests they might try implementing injection timings as in LEIR, where there is a single timing triggered multiple times for sequential injections, whereas the PS has multiple different events. This will require discussion of PS requirements, and what would be done by EPC and what by CO. H. Damerau asks how it is implemented in the SPS, V. Kain says there is a group of timings that are triggered multiple times for subsequent injections.

## AOB

V. Kain presents a summary of the objectives for the year, which have gone very well, along with additional subjects such as reference measurements that came up during the year.

The next meeting will be scheduled during January 2019.