

Beam Commissioning Working Group

Minutes for 21 September 2018

Present: V. Kain, G. Rumolo, S. Albright, F. Antoniou, H. Bartosik, D. Cotte,
G. P. Di Giovanni, K. Hanke, A. Huschauer, G. Papotti, F. Roncarlo, F. Velotti

Meeting objectives

First of a series of meetings to discuss the integration of LIU equipment, starting with the new SPS beam dump.

Approval of Minutes and Matters Arising - V. Kain

- Minutes not yet available from the previous meeting, they will be distributed for comment soon.
- Follow-up points from previous meetings reviewed, no new points and no change in status to existing ones.

LIU-SPS Beam Dump F. Velotti

Presentation

- High energy beam dump will be moved to LSS5, low energy dump will be removed and not replaced as it will no longer be required.
- Three MKDVs (vertical kickers) will be available for redundancy, only two are required.
- The new MKDVs will have solid state switches enabling all energies to be dumped into a single beam dump without the current forbidden energies.
- Synchronisation between the RF and the dump kickers is not yet available for emergency beam dumps, but will be used after LS2 imposing requirements on the new RF.
- XPOC and IPOC functionality is considered (eXternal Post Operation Check and Internal Post Operational Check). XPOC is slower as it uses multiple signals from external devices, the required time depends on how many, and which, systems are to be checked.

Discussion

- H. Bartosik asks if optimising the vertical dogleg for Q26 is the best option, or if as a compromise it can be optimised for Q26 and Q20. F. Velotti explains that the most stringent requirement comes from the available aperture for the slow extracted separatrices.
- F. Roncarolo asks if real time information on injected/circulating intensity will be distributed as in the LHC. V. Kain explains that it will be needed for various systems and there will be discussion of requirements.
- G. P. di Giovanni asks if during the 4 weeks of reliability run before beam they will discuss with controls to have all necessary services available. F. Velotti says that this is planned but has not yet been organised. V. Kain explains that it might also be only organised during the hardware commissioning.
- H. Bartosik asks if the beam requirements for commissioning the dump system fits within the existing schedule for beam commissioning. V. Kain says that it seems to align with what was already desired for RF. Details still need to be worked out.
- V. Kain says that there are also still technical difficulties that need consideration due to the relatively fast (compared with the LHC) cycle of the SPS. H. Bartosik asks if time constraints will be a problem, and if a system like the XPOC will be possible. F. Velotti says that it is worth trying to enable this functionality as it would be beneficial if it can be done.
- V. Kain says that the solid state switches have advantages, such as speed; but they can break and monitoring is essential, which is why systems like XPOC and IPOC would be useful.
- G. Papotti asks how likely it is that the time scales will be short enough as in the LHC it takes about 2 minutes to retrieve the XPOC data, which is no problem for the LHC but much too slow for the SPS. V. Kain says there is progress on improving the post mortem system and hopefully this can be solved for the SPS.
- G. P. di Giovanni asks if there is any contingency planned in the schedule. F. Velotti says the schedule is not very tight at the moment, with a couple of weeks at the end of 2018 and 4 weeks required at the end of LS2. G. P. di Giovanni asks if there are any tests that could be delayed if required due to time limitations. V. Kain says the full list of tests is required and planning for contingency is a good idea, they will look at scheduling accordingly as plans develop for commissioning.
- H. Bartosik observes that at the moment the schedule looks under control, V. Kain agrees but thinks it should be carefully monitored as time goes on.

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Plans for a PS BQM - K. Hanke

Presentation —

- Transverse measurements could be useful, but there is currently no system available and purely longitudinal measurements will still be useful. The idea would be as close as possible to match the SPS BQM system allowing duplicate hardware to reduce the complexity.
- The advantages of a PS BQM would be to allow dumping the beam at lower energy in the SPS and identifying where in the complex beam quality degraded.
- The current Wall Current Monitors signals are split as much as possible and so a new one would be required for the BQM, discussions are ongoing.

Discussion —

- H. Bartosik asks if the system could be designed with one of the current WCMs, then implemented with the new one, K. Hanke thinks it would be.
- G. Papotti explains that they did not plan to have new hardware for the SPS soon after LS2, however given the likely time scales for the PS system it might be possible to duplicate hardware when they do. Discussion of the requirements for the PS system and the possibility of duplicate hardware will continue this year.
- V. Kain asks if the BQM would be connected directly to the SPS via something like a fiber optic for triggering the dump, or if it would go through FESA and be more indirect. G. Papotti says that the SPS BQM uses a timing event to trigger dumping or not dumping, the main issue is ensuring it is failsafe so that if the software does not work it triggers a dump by default.
- V. Kain thinks that in the context of triggering the SPS dump the first step should be to have the measurement running in the PS and see how effective it is. If it is likely to be useful for triggering the SPS dump it will then be worth discussing whether a hardware of FESA connection is more suitable.
- G. Papoitti doesn't think it would be essential to dump at flat bottom in SPS if waiting for the flat top is more suitable. V. Kain agrees and thinks one big advantage would be a confirmation of beam quality at extraction from the PS during the setting up.

General Discussion

- In the context of commissioning in general and LIU items in particular V. Kain says that requirements for services etc should be carefully discussed to optimise plans. G. Papotti thinks it might be possible to interleave commissioning steps to allow different teams to work at different times rather than requiring all services to be available simultaneously.
- G. P. di Giovanni thinks that coordination with experts is important to ensure they are available when different systems are being commissioned to minimise scheduling conflicts.