Beam Commissioning Working Group

Minutes for 23 November 2018

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

Meeting objectives

Presentation and discussion of the plans for the Linac4 LBE line run.

Approval of Minutes and Matters Arising - V. Kain

The minutes of the 16^{th} of November are accepted without comment.

Linac4 LBE Line Run - B. Mikulec

Presentation

- Linac4 is now approaching the beam specifications given in EDMS 1898179.
- Many devices and operational practices that could not be tested previously will be tested in the LBE line run.
- Individual System Tests will start in week 35 for Linac4 and week 36 for the line, beam tests week 40 to 49.
- A detailed week-by-week schedule of planned works for each system, starting with the ion source and progressing to the end of the LBE line has been prepared.
- Main beam tests are scheduled to last for 4 weeks.
- The schedule is very dense, therefore the planning needs to be made very carefully and stuck to.

Discussion

- M. Gourber-Pace asks what the problems with PPM operation were. B Mikulec says there weren't specific problems, it was just necessary to make sure everything would operate in PPM.
- V. Kain asks if the transfer line commissioning is expected to be smooth, B. Mikulec says yes, but with the decabling of the PS there are risks it will take longer. V. Kain asks what is needed for the RF, B. Mikulec says that systems like the debuncher can only be tested with the diagnostics in the LBE line.
- F. Roncarlo asks about the emittance measurements with different devices, B. Mikulec confirms that the SEM grids still need testing with new applications.

- M. Gourber-Pace asks if B. Mikulec is the link person for commissioning with CO. The discussions before now have been with A. Lombardi and R. Scrivens for the source, B. Mikulec confirms that is correct for the source, and the rest of the machine is her.
- M. Gourber-Pace asks when the 3 days controls dry run is planned, B. Mikulec says it is to be discussed with EPC, CO and RF exactly when would be best but shortly before week 35.
- V. Kain asks why it is expected that so much time will be required:
  - B. Mikulec says that an important factor for this run will be getting the beam quality, it is hoped that the hardware commissioning stage will go faster than scheduled, however from experience some parts have required a lot of work and this is considered in the scheduling.
  - F. Roncarlo gives the example of phasing the cavities, which in the first iteration was a very slow process, this is getting faster and can hopefully be automated later, but will still take time for now. V. Kain asks if something like this can be considered a one off, B. Mikulec says yes and gives the example of the new filters, which must be tested as part of this run, which will require time, but should then be stable and not impact future start-up times.
  - B. Mikulec says that a significant amount of time is dedicated to RF, due to the large number of cavities and the complexity of the controls. The RF team have been working very hard, but there are still open issues and development requirements that need solving and it is always possible that new ones will be discovered.
  - B. Mikulec emphasises that the schedule is based on recent experience of how long things take, and that if something can be completed early it will be and the schedule will be modified to take advantage of the time. F. Roncarlo says that it is worth having this much time, because it will be used and will be beneficial.
- M. Gourber-Pace asks if having a more conservative schedule for machines like the SPS is a problem. G. Rumolo suggests perhaps it might be a warning light for the SPS that they haven't allocated enough time.
- G. P. di Giovanni points out that the 6 weeks for the SPS was determined a long time ago, and it is not necessarily correct to directly compare them. V. Kain agrees.
- F. Roncarlo says a lot of work is ongoing for automisation, and more should be done, but a lot of things should be faster in the future as a result.
- H. Damerau says that another consideration is how easily results from the tests bench can be ported to the tunnel after installation, which will not be equivalent for every system and machine. F. Roncarlo says that in a similar way for the higher energy machines they already know within quite tight limits what types of beams they will be getting and how the machine should behave, which is not the case for the Linac.
- V. Kain asks how long is required to start Linac 3 for comparison. K. Hanke and B. Mikulec point out that due to the way Linac 3 is used and the large parameter space for Linac 4 beams there's no meaningful comparison between them.
- F. Roncarlo asks about scheduling in terms of out of hours work. B. Mikulec says that the intention is to include weekends (but not nights) for work, but 24 hours of beam. However, this is still to be finalised.

- V. Kain asks how it would compare to restarting after a normal YETS. B. Mikulec says that it will be faster, but how much faster cannot yet be known because there is still a lot of work to be done with the machine.
- G. P. di Giovanni susggests asking a representative of the Linac 4 RF team to present in the future to allow technical questions to be directed to experts as this is where a lot of time will be used. V. Kain agrees.

The next meeting is on the 14^{th} of December on the PS beam commissioning schedule.