

Minutes of the Booster Commissioning Working Group held on 6th of November 2008

Present: W. Weterings, J. Borburgh, A. Lokhovitskiy, I. Kozsar, C. DeAlmeida Martins, G. Bellodi, T. Hermanns, K. Hanke, B. Mikulec.

Excused: C. Carli, T. Zickler.

Agenda:

1. Communications
2. Follow-up of open actions
3. News on the injection chicane layout (W. Weterings)
4. First thoughts about commissioning scenarios (K. Hanke)
5. Status and urgent needs for Linac4 application software (K. Hanke)
6. AOB (Linac4 operation, scheduling)

1. Communications

The minutes of the last meeting have been approved.

2. Follow-up of open actions:

- **EVM document for power converters:** C. DeAlmeida has included the tasks for power converters in the Linac4 to PSB transfer line in the EVM document, but a quantitative evaluation is still outstanding.
- **Collimators upstream of the septum:** There weren't any inquiries done on the subject. It was stated that the collimators could relax the head/tail dump. One should also follow up the proposal to add a halo dump in the distributor.
- **Removal of lead distributor:** The question was raised if the replacement tube for the lead distributor could be designed and produced by the Pakistani. This will be followed up by B. Mikulec.

3. News on the injection chicane layout:

W. Weterings reported on the status of the injection chicane layout. C. Carli and his team made simulations that showed the existence of optics perturbations with the current layout; beta beating seems to be present due to the chicane and painting bump.

The current layout consists again of a symmetric chicane, but to reduce the beta beating the field should be as low as possible which requires magnets as long as possible with the existing space restrictions.

As a consequence the **beam position in the injection straight has to be lowered by 10 mm** (should be taken into account in optics simulations by A. Lombardi and her team), and the **painting bump** will need to take the beam to a position at **35 mm** instead of previously 27 mm.

The injection dump will have to be inside vacuum due to space limitations, but it might be possible to keep the magnets outside vacuum (which would be preferable). The choice of magnets still has to be studied. During the shutdown it should be checked (access into the PSB) if there is a possibility to place the injection dump behind the wall.

Assigned to	Start date	Description	State	Result	
	2008-11-18				edit

K.Hanke,
W.Weterings

Access PSB to check if
PSB injection dump
could be located in the
prolongation of the line
behind the wall.

PSB injection region has been
visually inspected by W. Weterings
and B. Mikulec on 19th of March
2009 (photographs taken by W.
Weterings). The layout of the
region has to be found.

W.Weterings agreed that it would be useful to revise the complete PSB injection section beginning of next year also in view of the urgent power supply procurement (see AOB). He will try to organise this.

4. First thoughts about PSB commissioning scenarios:

K. Hanke explained first the different steps that should be taken before commissioning of the PS Booster with beam:

1. *Ensure that PSB hardware and software is available*: This task includes the identification of instrumentation needs and a complete inventory and suitability check of magnets and power supply, instrumentation, application software etc. This includes not only the PSB rings, but also the LBE/LBS upgrade, the injection region, the transfer lines and the PSB dump line. Therefore the re-design of the injection region should be followed closely. Consolidation work and required changes should be advanced where possible (e.g. installation of new bumpers, removal of lead distributor).
2. *Scheduling*: Identify and plan in detail the different commissioning steps (transfer lines, BI line, PSB injection, PSB rings).
3. *PSB MDs for the coming years*: Participate and initiate MDs in the PSB to prepare the operation with Linac4 (for example on production and transfer of single batch LHC beams).

Beam commissioning with Linac4 as injector:

1. *Staged commissioning*: The first aim should be to reproduce the current operational beams, probably without longitudinal painting. The next milestones still need to be defined in more detail.

A detailed work package description is under preparation by K. Hanke and will be presented on 9th of December during the Linac4 work package holder meeting.

5. Status and urgent needs for Linac4 application software:

K. Hanke prepared a list of applications that will be required for Linac4 operation (see L4_applications_shutdown_08_09.pdf). Most applications that have to be written concern instrumentation. Additional areas are for example source and LEBT and the 3 MeV line. Time lines are given in the file as the OP team will already start this shutdown (due to the short shutdown work needs to be well organised). Priority should be given to the following applications: emittance scanner, slow wire scanner, Faraday Cup, Feshenko monitor, SEMgrid and transformers.

A. Likhovitskiy added that his team is about to review the Booster and PSB injection line software. Renovation will start soon to bring all the software under FESA. Care has to be taken to handle PSB timings correctly.

For the power converters the future platform will be based on world FIP. It has to be found out with Q. King and S. Paige if on the application side there is work to be done by OP as the PO responsibility stops at the gateway. Will there be a FESA class required on top of FGC3?

There is no information available if applications are needed for RF control; M. Vretenar should be questioned on this subject.

3. News on the injection chicane layout:

6. AOB:

PSB review: There will be a PSB review in view of operation with Linac4 on 15th/16th of January 2009. The program is in preparation, but preliminary subjects, speakers and reviewers are already available. Speakers and reviewers will receive soon an official invitation.

Schedule: The schedule has been modified to implement the remarks from this working group. The item 'Commissioning of transfer line' planned for the 2012/2013 shutdown should be clarified to reflect if it concerns only the commissioning of the new transfer line or of new and old transfer lines (see item 30 in Planning.pdf). The latter case is of course preferred as the beam can be characterised in the LBE/LBS measurement lines.

After the meeting it has been confirmed by S. Maury that the commissioning concerns both transfer line as the beam stopper in the new Linac4 to Linac2 transfer line will not be able to absorb the Linac4 beam. The modifications of the PSB injection period and to LT.BHZ20 will also happen during the 2012/2013 shutdown with PSB commissioning with beam running into June 2013.

Magnet and power supply list: C. DeAlmeida mentioned that they are planning to place an order soon for the new power converters. It is therefore urgent to clarify the required procurement. The magnet and power supply inventory should therefore be checked again and for example the steerers BI.DVT/DHZ70 should be added (8 power converters!). Possible magnet/power converter changes should also be clearly marked in the file.

Attached is the current, updated version of the inventory (reference_nov08-v2.xls).

Operating Linac4: K. Hanke mentioned that it should be clarified who will be responsible to operate Linac4. To prepare Linac4 operation with beam it has to be assured that hardware and software is adapted to the operational needs. This includes the possibility of ppm operation and adequate beam steering. It has to be made sure as well that application programs follow CO standards and are maintainable (application programming done within OP). Operational scenarios have to be developed. Another important item to take care of is machine protection, watchdog alarms and interlocks.

-- BettinaMikulec - 14 Nov 2008

- L4_applications_shutdown_08_09.pdf: Overview on Linac4 software applications.
- Planning.pdf: Schedule.
- reference_nov08-v2.xls: Magnet and power converter inventory.

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