

MACHINES AND AREAS COMMITTEE

Summary of meeting No. 66 - January 27, 1977

Present

O. Barbalat, D. Bloess, J. Boillot, D. Dekkers, D. Fiander,
M. Georgijevic, C. Germain, P. Germain, R. Gouiran, B. Kuiper,
G.L. Munday (Chairman), G. Nassibian, G. Plass, K.H. Reich,
Ch. Rufer, F. Völker

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1. Multibatch SPS filling*

Since the last meeting on this subject (MAC No. 62, October 19, 1976), several new facts have occurred which have led to modifications of the project presented in PS/AE/Note 76-17.

- The SPS requests that the PS be able to provide all the possible beam transfer modes including the 3 batch transfer one for which the existing equipment is not robust enough.
- The full capability of the present FAK system (i.e. 12 modules) must be preserved for 26 GeV/c extraction of beam with large momentum spread for \bar{p} production.
- Two FAK modules with inverted polarity will have to be devoted for some time to the g-2 experiment.
- The "Services Industriels de Genève" (SIG) have just reacted informally to the results of the pulsing tests at a higher repetition rate.

An updated version of the proposal (not yet taking into account the SIG reaction (PS/AE/Note 77-2) has been prepared and presented by D. Fiander.

* This is the official name of what used to be called "PS multipulsing for SPS".

a) Beam Transfer Equipment

To allow all the possible transfer schemes required by the SPS the existing continuous transfer system (already capable of one and two batch transfer, i.e. extraction over 10 and 5 turns) will be complemented by a faster fast bump. This will allow high efficiency shaving extraction over one or two revolutions so as to be able, when used in conjunction with the FAK, to furnish beams for 3 or 5 batch filling. The possibility of 10 batch filling with the FAK alone has always existed. The description of the hardware and possible location in free PS straight sections is given in PS/AE/Note 77-1.

The construction of this equipment leads to a cost increase from 5.9 to about 8 MFr. with 25 man-years of staff and 12 man-years temporary labour. The details of the cost and the contribution of PS Groups to the project are given in PS/AE/Note 76-17 Add. It will also require a new building adjacent to Building 359 in the Ring Centre to house this equipment.

b) Cycle Time Reduction

The implications of a shorter PSB cycle on the magnet supplies and magnets have been studied in detail (F. Völker, PS/BR/Note 76-25) together with the beam dynamics constraints (F. Sacherer, CERN/PS/BR 76-8). It was concluded that no additional cavity was necessary for Booster cycles of 0.6 s.

The tests with a pulsed load on the SIG network (B. Godenzi, F. Völker, CERN/PS/BR 76-17) show that there is a resonance peak in active power drawn from the generator for 0.75 s cycles (Fig. 5). It is likely that SIG will ask that one works at a repetition rate for which this level is comparable to the present one, i.e. at 0.6 s or 1.0 s but not in between.

Whereas a PS main magnet cycle of 0.65 s is possible (see PS/AE/ * Note 76-11), it remains to be demonstrated by tests in the presence of beam that this can be further reduced to 0.6 s whilst maintaining adequate safety margins.

On the other side, it appears that the use of a 200 MHz accelerating system in the PS might reduce slightly the cycle time, the 800 MeV injection procedure could be speeded up, and one might even lower slightly the SPS injection energy.

* In this context, R. Gouiran pointed out that one should analyze, and if needed, correct the differences between consecutive A cycles followed by B cycles within a supercycle. This correction might cost some time as well as the need to provide a zero current phase in the figure of 8 loop for correct operation of the peaking strip used as a reference for B timing.

Considering all these elements, the PS Performance Committee is asked to analyze in the coming weeks the minimum time required by the various phases of the PS cycle and evaluate implications of safe operation at a 0.6 s (rather than 0.65 s) repetition time (costs and constraints).

c) Other Considerations

- Estimates for additional buildings (both for the PSB and the PS) have been included in the project. However, as the space in the existing Building 359 is already more than well used, it would be sound policy to build one or two additional bays beyond the minimum space necessary for the project (construction of 3 bays instead of one would increase the PS building cost from 450 to 950 kFrs.).
- Temporary labour estimates are a minimum and assume that most of the equipment construction is carried out outside CERN. If some of this has to be done inside CERN more temporary labour will be used but the total price will not increase as this work will then not be given to outside firms. An amendment to the project authorization would be made as soon as this situation arises (this is also valid for all other divisional projects).
- The time scale of the project will extend over 2½ to 3 years depending among other things on the availability of staff who have other commitments. In particular, it was repeated that the Controls Improvement (Project D015) has first priority.
- As far as is known today, spare parts and consequences for capital investment on account of increased radiation damage and induced activity, have been included in the cost estimates, but not of course any potential increase in the operating costs.

This proposal will be now discussed with SPS and a joint project including the SPS part presented in February to the "Accelerator Club" and then to the Executive Board.

2. Future Meetings

- March 1 : - Patch-panel for PS auxiliary supplies,
- Programme of May shut-down,
- Review of possible replacement and development projects.
- Mid March : - Status of SC projects.
- May : - Booster beam loss monitors.

O. Barbalat

Distribution : PS Scientific Staff

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