

MACHINES AND AREAS COMMITTEE

Summary of Meeting No 19 - January 16, 1974

Present : O. Barbalat (Secretary), D. Bloess, J. Boillot, D. Dekkers, M. Georgijevic, C. Germain, R. Gouiran, L. Hoffmann, J.H.B. Madsen, J. Merminod, G.L. Munday (Chairman), G. Plass, Ch. Rufer, Ch. Steinbach, M. van Rooy.

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The meeting was devoted to a review of the beam dumping situation presented by Ch. Steinbach (see MPS/OP/Note 74-4).

1. Operation procedures

A complete analysis has been made by D. Dekkers (MPS/CO/Note 73-65) and several measures proposed. D. Dekkers was asked to report on the result of this action after 6 months of application (August 1974).

2. External beam dumps

To be used during setting-up and when the operation of the channel is interrupted.

2.1 Channel 16

After discussion with the ISR (Minutes of discussion by J. Madsen, dated Sept.26, 1973), it appears that the use of D1 will continue to be restricted and that there is a limited confidence on its reliability. D3 is too far away from the PS (40 beam transport elements to be powered) which is a potential weakness. In view of the importance of this channel for the future PS, it was decided to construct a static dump line along the proposals made by J. Boillot (MPS/CO/Note 73-28).

Several improvements have been made since the first proposal (gain of place possible if D1 is removed). There is no incompatibility with the new Linac. The access from the Linac to the inflector area (door 45) will be preserved.

A final design proposal will now be prepared by J. Boillot and Ch. Steinbach to be submitted to the MAC within 2 or 3 months.

It will provide for handling the alternate pulses of different energies for ISR and the SPS; therefore laminated magnets and suitable power supplies. Existing devices (ISR, EA?) will be used if possible. It will also be checked with Health Physics that there are no problems which might appear troublesome later, with the dump block location. Formal approval from ISR will be requested for the minor optics modifications necessary.

## 2.2 Channel 62

Two solutions appear possible :

- put a proper dump at the end of the test beam line and rearrange the layout (add a bending magnet to increase the distance between the dump and  $e_0$ ), the shielding and the interlocks accordingly so as to minimize the access restriction in the East Area;
- design a beam stopper placed more upstream in the beam (as foreseen for the new East Area layout) which could serve as a dump and handle the full high intensity beam for extended durations.

The MU group will study the pros and the cons of this alternative and propose recommendations within 2 or 3 months.

## 2.3 Channel 58

It is not planned to have ever more than a few bunches (maximum 5) in this channel. With minor modifications this can be handled by the beam stopper (see section 3). Furthermore in case of interruption of the fast extraction operation, the beam fraction can rather easily be sent into the slow extraction channel in use.

## 2.4 Channel 74

The life time of this beam exit is limited (Gargamelle to be stopped by mid 1975 and g-2 12 or 18 months later), and it is not worthwhile to invest there any substantial effort except the minor modifications similar to those for the other beam stoppers.

## 3. Beam stoppers in primary beam channels

A study by J. Boillot (MPS/CO/Note 73-68) show that the present beam stoppers cannot handle the total intermediate intensity beam for more than a couple of hours. However they are no substitute to the beam dumps discussed in the previous section. They should only be able to withstand a few hundred pulses. It is intended to make some minor modifications to increase their radiation resistance (metal seals) but not to make a new design for high intensity (water cooling, etc.) except for channel 62 if this appeared a better solution than the use of the test beam for dumping.

## 4. Internal dump target

A study is now underway (following the decision made at MAC meeting No 11). The efficiency calculations have been completed and confirm the chosen

parameters (15 cm vertical moving copper block). It is proposed to build by May 1974 a model to check the performance of the proposed mechanical resonant system. The construction could start in July and the system be ready by Autumn 1975. It appeared to some persons present that the model tests of this system might delay the whole project. In view of the urgent need of this device, they wondered if a more conventional although less efficient mechanical solution would not be more appropriate and involve less risks of further delay. It was suggested to consult other experts on the problem of fast acceleration of heavy masses. It was agreed that Ch. Steinbach would report on the progress made after two months.

A design proposal of the project (with resource estimates) will have to be made as the total price will be above 50 kFr.

During the discussion it was stressed that the location of this dump target should be carefully chosen in a straight section where no intervention is required (to be discussed with U. Jacob). The downstream magnets should be reinforced beforehand and could then stand several years without attention.

#### 5. Resonant dump

Ch. Steinbach presented briefly the report on his study (MPS/OP/Note 74-5). Although initially attractive too many limitations and drawbacks (tuning sensitive to other machine settings, efficiency only a factor two better than the internal dump target) appeared so the idea has to be dropped.

#### 6. Emergency dumping by fast kicker

Ch. Steinbach has recently published a note (MPS/CO/Note 73-76) showing that the chamber would not melt if the whole  $10^{13}$  p/p beam was accidentally lost. One will however ask H. Bargmann (Lab.II) to study the effect of the induced stress in the chamber walls. Nevertheless, a failure of the electrostatic septum or the thin septum magnet could occur if the whole beam was entirely lost on these devices in a few milliseconds.

It remains now to make a more thorough analysis (D. Bloess, C. Germain, Ch. Steinbach) of the probability of such a catastrophic event which might occur during the setting-up of the slow extraction or the continuous transfer, and on the shortest delay for firing an emergency dump (D. Bloess, D. Fiander). No resources being available in 1974 anyhow for starting a project, there is no need for a rapid decision. In the meantime, one would have some experience with the operation at the intermediate intensity and with the corresponding operating procedure.

It was mentioned that intensities up to  $2 \cdot 10^{13}$  p/p ought to be considered.

#### 7. Miscellaneous

J.P. Potier will replace D. Dekkers as representative of the Operation Group on the PS Installation Committee.

8. Next Meeting

Wednesday January 30, at 14.30 h.

PS Small Conference Room

Agenda : - Work programme of BR Group  
- PS Machine Development program for 1974.

O. Barbalat

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PS Scientific Staff

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