

WEST HALL PHYSICS :

THE FINANCIAL PROBLEMS OF THE FIRST STAGE

There is a deficit of the order of 2 M.Fr. in the finances of the first phase of the West Hall 25 GeV physics project. The definition of the first phase for this purpose is : the use of Omega with a high energy beam (≤ 15 GeV/c) fed from slow ejected protons from SE 16 : the use of BEBC with an RF separated beam fed from fast ejected protons from FE 16. The budgets under consideration are up to the end of 1972. A BEBC neutrino experiment is not considered here as it is presumed to be related to a "High Intensity" PS for after mid 1973 and will be the subject of a separate note. The deficit appears despite some savings and voluntary limitations; appendix I ~~lists these items.~~

A suggestion has been made that would allow a further saving of up to about 1.2 M.Fr. and hence reduce the deficit. This suggestion is that one does not buy all of the balance of the steel shielding needed for the West Hall.

If the Omega and BEBC programmes are not to be delayed, that is to say, start with the beams in the beginning of May 1972, it is important that we reach a conclusion about the likely solutions to the problem of shielding within the next few weeks.

The total shielding needed is 3 400 tons. Shielding on order 1 260 tons of blocks, 360 tons of bars. Thus 1 800 tons of blocks are to be found.

The courses open to us to get shielding are :

1) Buy a further 1 800 tons. Cost about 1.2 M.Fr.
Offers must be asked and an adjudication placed before the Finance Committee of 23rd June 1971. We then should be fully operational in May 1972 in the West Hall with all the present PS facilities untouched.
If this option is taken, action is urgent.

2) Find some or all of the steel around the PS.
The disposition of the steel is shown in Appendix II.

a) Stop temporarily or permanently some TC and/or NP beams in East Hall and order the balance needed.

Examples : (Tonnage approx. only except for item 1)

i) $m_6 + k_8$ (partial) for 2 m HBC	1 230 tons
ii) b_{17}	230 tons
iii) $b_{17} + p_4$	500 tons
iv) $e_{9s} + b_{19}$	≈ 800 tons

Thus for example the combination i + iii would fill the need. But then how could we give low energy beams to ~~the 2 m HBC~~? A possible solution is indicated in the last paragraph of this note.

b) Take 1 800 tons (leaving 1 300 tons for a non neutrino beam into Gargamelle) from the Gargamelle neutrino experiment. On the present plan which is - neutrino then m_{12} beam + T_{191} experiment, then again neutrino (see PS Coord. 231/Rev. 2), this would mean that the West Hall could be fully operational only around mid November 1972.

c) This is a variation of b).

If we do not install the m_{12} beam this year and only do a neutrino experiment (say 1 M pictures) in 1971 and the first part of 1972, we could have the West Hall fully operational by the end of July 1972.

The following obvious comments may be made to solution 2b or 2c.

- i) The West Hall programme is linked to the Gargamelle neutrino experiment.
- ii) If one wishes to carry out a further Gargamelle (or BEBC) neutrino experiment in say 1973, the iron would have to be bought, but not paid for until 1972/73.

One may of course mix solutions type 2a with 2b so that iron shielding is moved to where it is needed. The programming of such moves and the time taken may not easily coincide with the wishes of physicists with respect to the timing of their experiments.

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APPENDIX I

OVER EXPENDITURE AND SAVINGS

A. OVER EXPENDITURE

There is a deficit on the buildings associated with the West Hall of 2 087 M.Fr. This will be the subject of a separate report from SB Division.

B. SAVINGS OR VOLUNTARY LIMITATIONS

- 1) The use of ISR ejected beam transport and power supplies in the primary proton beams in the West Hall : the decision was made in 1969 with a saving of about 3 M.Fr. on present day prices.
- 2) In 1970 when the offers for the beam transport were received some items were up to 38 o/o more expensive than estimated. A decision was made to stay within the budget and simplify the design of the beams plus using some from the general pool of beam transport.
- 3) Late 1970, after discussion in the Working Group on the West Hall, the beam layout was altered to use a common ejected beam tunnel in place of the two originally planned for the Omega and BEBC targets. This enabled the concrete shielding order to be reduced by 25 o/o. Saving 0.7 M.Fr.
- 4) Early 1971, after a discussion in the Working Group on the West Hall, it was decided to stop WRB 2 (Rectifier Building). This building had been rendered almost superfluous for stage 1 by the change in layout coming from the previous savings. A saving of less than 0.5 M.Fr. was made because many items for the building had been ordered.

Appendix I

- 5) Reduction in "controls" (doors, safety, television, etc.) to a minimum. The decision was made in March 1971 with a saving of 0.4 M.Fr.
- 6) On the remaining items still to be ordered by MPS Division savings will be made whenever possible : this is under study, but these savings will be small.

APPENDIX II

THE DISPOSITION OF STEEL SHIELDING AROUND THE PS

1.	South Hall beams	103
2.	p_4/p_5 experimental area	96
3.	u_5	139
4.	$e_6 + m_6$	1 002
5.	k_8 (incomplete)	230 [*])
6.	neutrino in SE Hall	3 093 ^{**})
7.	e_9 complex	3 518
8.	stock	157
TOTAL		8 338 tons (+ 15 tons of blocks broken = quantity delivered)

*) k_8 can be made operational by a redesign and new installation of the complex $e_6 + m_6$

**) Plus 710 tons of ingots which must be left where they are.