MASTER

A pp COLLIDER CONSTRUCTION SCENARIO

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In order to bring the Fermilab proton-proton colliding-beam facility into operation at the earliest possible time, close coordination between the various aspects of the construction is essential. We present a possible scenario for how the installation might proceed, and point out some important consequences for planning in the immediate future.

Table I represents our attempt to fit together the various phases of construction in an optimistic yet realistic fashion. We have not tried to integrate the pp or ep collision programs into this schedule because of numerous technical uncertainties still to be resolved. Until the early 1980's, the several efforts can proceed more or less independently, aside from the usual demands on personnel and support services.

Some important milestones in the Table I schedule are

October 1977	Engineering design of the W detector begins
April 1978	Call for "second area" proposals
April 1978	Construction of W detector begins
May 1978	Lower one sector of the Main Ring
August 1978	Sector test begins
November 1978	PAC selects first-round experiments for the second area

December 1978	Construction of experimental halls begins
October 1979	Superconducting ring installation completed
January 1980	Start of colliding-beam physics program
January 1981	Start of 1 TeV fixed-target physics program

We have assumed that there will be two experimental halls for colliding-beam experiments, one devoted to the large "W detector" and the other to several smaller experimental setups which can operate concurrently. In order to maintain vigorous programs in both colliding-beam and fixed-target physics, it is essential that the experimental halls provide quick and convenient access to apparatus, and that major parts of the detectors be easily removable for modification and development during periods of fixed-target operation.

It seems likely that simultaneous colliding-beam and fixed-target operation will be practical only during tuneup; therefore, alternating three-month periods of fixed-target and colliding-beam operation are assumed to begin in 1981. The actual time devoted to each program in the long term will of course be decided on the basis of physics interest.

Some important conclusions can be drawn from the scenario presented in Table I:

1. Experimental hall construction must be completed early in the schedule in order to allow for efficient fabrication and installation of the colliding-beam detectors. If hall construction is to require only a three-month shutdown of accelerator operation, preliminary work must be begun well in advance of the actual shutdown.

2. The large W detector may not be completely assembled in time for the turn-on of the colliding-beam facility in 1980 and its construction should be planned so that useful modules will be ready at turn-on. Completion of the detector by gradual addition of other subsystems will occur over a period of years. It is essential that this process be planned so as not to compromise the effectiveness of the completed detector, whose subunits should be designed to complement each other and to operate together in a coherent fashion.

3. Because of the substantial Laboratory effort which will be required to bring the colliding-beam facility into operation on the time scale shown, a significant fraction of the physicist manpower needed to build the various detector systems will have to be drawn from the user community.

4. Design and construction of the W detector must begin in the very near future, and proposals for user experiments in the second area must be solicited as soon as possible.

5. The level of funding likely to be available for experimental halls and detectors (from Fermilab and from user institutions) should be clarified soon, to facilitate efficient planning. Table I suggests the following schedule (in millions of 1977 dollars):

<u>FY</u>	<u>Experimental Halls</u>	<u>Squeezer Magnets</u>	<u>W Detector</u>	<u>User Detectors</u>
78	0.5	---	0.5	---
79	3.0	1.5	4.5	1.0
80	0.5	1.0	3.0	3.0
81	---	---	2.0	1.5
82	---	---	---	1.5
Total	<u>4.0</u>	<u>2.5</u>	<u>10.0</u>	<u>7.0</u>

Table I. Proposed schedule for the construction and installation of the pp colliding beam facility.

	Calendar Years				
	78	79	80	81	82
Accelerator operation	██████████	██████████	██████████	██████████	██████████
FT operation	██████████	██████████	██████████	██████████	██████████
Sector test					
ED, CB tuneup			██████████		
CB operation				██████████	██████████
Lower one MR sector	██████████				
Expt'l hall construction		██████████			
S. C. ring installation		██████████	██████████		
Tevatron installation			██████████		
W detector Design and development	██████████	██████████			
Construction: core detector	██████████	██████████	██████████	██████████	
outer modules		██████████	██████████	██████████	
Installation		██████████	██████████	██████████	
Other expt's Proposals	██████████	██████████	██████████	██████████	██████████
Construction	██████████	██████████	██████████	██████████	██████████
Installation		██████████		██████████	

Notes: Priority activity ██████████
 Parasitic activity
 FT = Fixed target; CB = Colliding beam;
 ED = Energy Doubler/Saver
 W Detector; solenoid configuration is assumed.