MODEL OF EXPERIMENTAL PROGRAM

FN-80
2020

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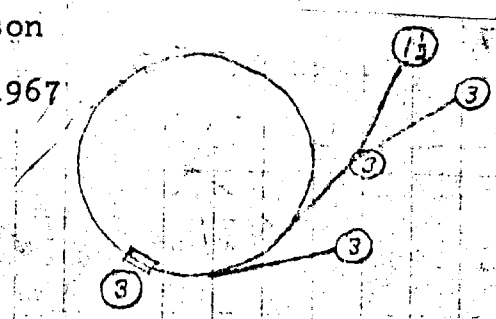


At a time of six years after first beam search in the main synchrotron (3 years after end of construction), we visualize beams set up and operating in the 5 target areas as follows:

(a) 13½ beams in place or being set up (indicated by numbers in circles)

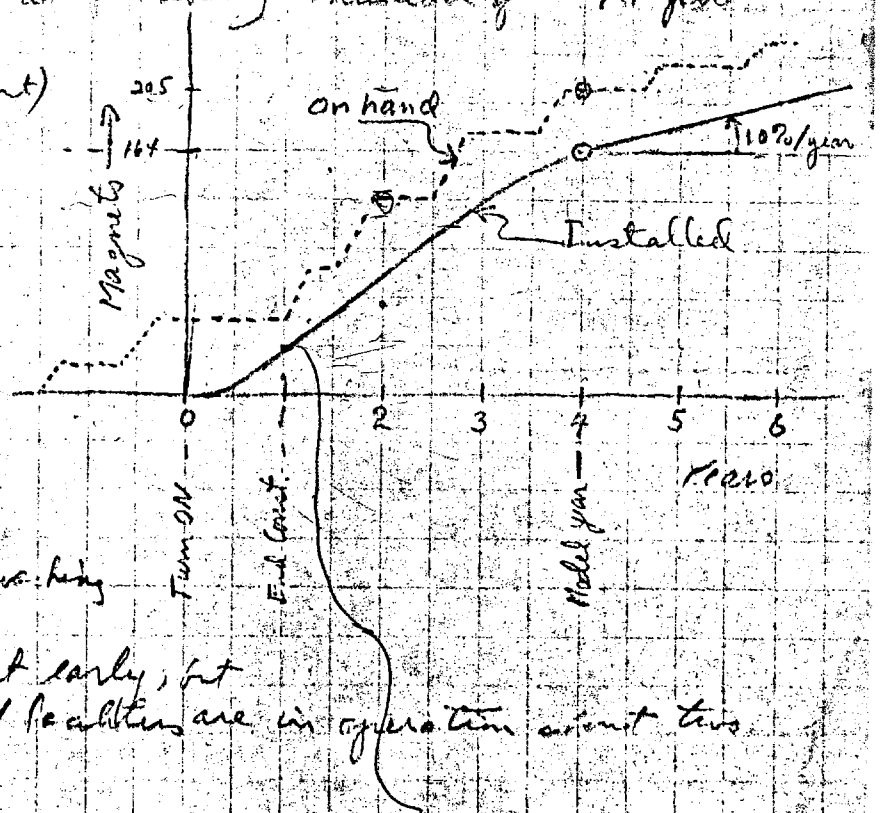
(b) 8 of these are in operation at one time, 5½ not operating

(c) 3 are bubble chamber beams, of which two are operating

(d) 2 are special long beams such as ν or r.f. separated beams, 11½ are std.

Equipment on hand will include that needed for the 2 special long beams plus the list of 164 magnets given in the Design Study Report (p. XIII-16) plus 41 magnets (20%) on standby, test, and repair. The 164 will populate the 11½ beams at an average number of ~14 per beam.

Build up of magnets (equipment) on hand and installed is sketched at right. Year zero is at start of beam search.



An initial order of magnets will be received and tested in time for use at turn-on. The second order will aware first operating data, but precede end of const. — delivery is ~8 months later. Thereafter build up as shown, approaching 10% per year rate.

The exp. program will start early, but use time inefficiently until full facilities are in operation about two years after turn-on.

9-30-66 IT WAS GLENN'S INTENT TO PROVIDE 2/3 OF 205 SECONDARY BEAM (+ NEUTRINO & R.F. SEPARATED BEAMS) MAGNETS FROM INITIAL CONSTRUCTION

No detail of sequence or duration of interruptions is predictable but the statistical proportion of time spent in various modes of operation may be estimated. During the period of test and development, pulsing may be interrupted from a few times to tens of times. Turn off of r.f. (and beam) would be more frequent and might occur intermittently through the next days as initial tune-up is underway. The 3-hr interruptions are merely examples of unscheduled wintdowns.

Operation of experimental areas, as measured by power consumption would generally follow the accelerator operation except that of the 262 operable days, any one target area may be shut down an additional 60 days. Another view is that on the average, 3 of the four external areas run at one time. External beam transport system (pulsed) would be on when both target station and accelerator operate, off when accel. or station are off.

(Revised 24 Sept.)

"Normal" operation after ~3 years of operation

Try to describe accelerator operating-time patterns after initial rehabilitation of ~2 years.

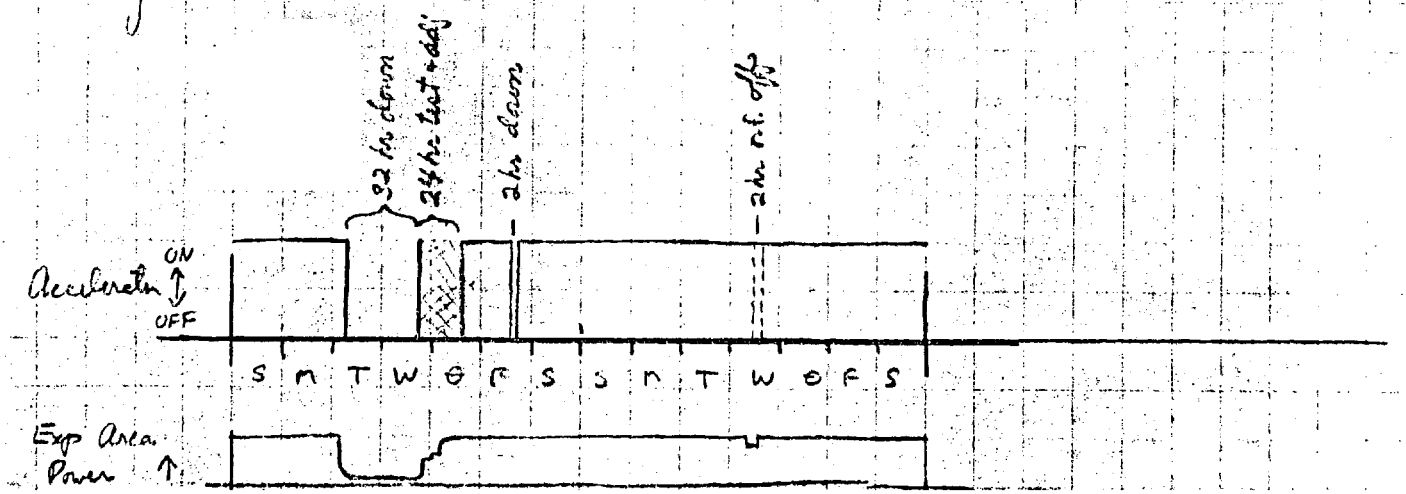
Assume 365-day year distributed as follows:

		365 days
Holidays	-15	
Routine shutdowns at 4 8-hour shifts per 2 weeks	-31	
Unscheduled shutdowns	-8	
Long shutdowns	-26	
		285 da (78%) accelerator operable
Accel. develop + test	-23	
		262 da (72%) operable for physics

Long shutdowns would occur at irregular intervals — preferably most during the busy summer season. An example for one year might be:

February —	6 days
May —	12 days
Sept, Oct	8 days long shutdowns
	26

In a typical 2-week operation cycle, accelerator operation might be as sketched:



The division of total time in a year will, at the model year, [illegible] of [illegible] stations:

		365 = 1 year
[illegible]	-15	
[illegible] shutdown [illegible]	-31	
[illegible] shutdown	-8	
[illegible] shutdowns	-26	
		285 (78%) accel. operable
Accel. [illegible] + test	-23	
		262 (72%) Operable for physics

The 262 days operable for physics, any one target station may be shut down about 60 days, leaving 202 days in which [illegible] may be delivered to that station's experiments. The internal area, of course, would have only the three weeks of major shutdown.

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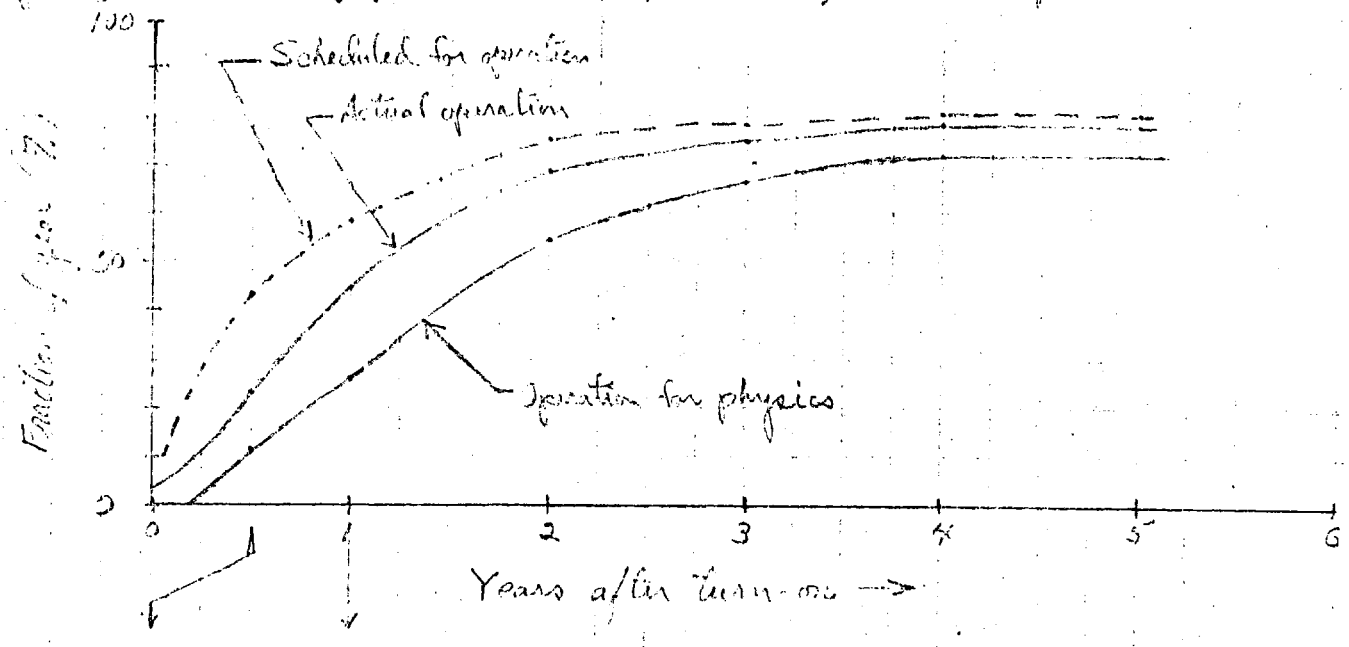
Below is an estimate of the utilization of time during the 5+ years following first beam search. Times are given in days of a 365 day year and in percent of 365 days.



	(365) 100%	(365)				
4 holidays	15	15	15	15	15	15
Shutdowns: Major	60	50	33	29	26	26
	(290)	(300)	(317)	(321)	(324)	(324)
Shutdowns: Routine	124	86	45	36	31	
	(166) 43.5%	(214) 58.6%	(272) 74.5%	(285) 78.1%	(293) 80.2%	
Shutdowns: Unscheduled	83	53	23	12	8	
	(83) 22.8%	(161) 44.2%	(249) 68.3%	(273) 74.8%	(285) 78.1%	
Develop + Test	42	64	53	30	23	
	11.3%	26.6%	53.7%	66.6%	71.8%	
A.E. Physics	41	97	196	243	262	

← Same as for 4 →

The above schedule was based upon assumed patterns of operation at the ends of years ½, 1, 2, and 4 as outlined below. A seven day, 3-shift-per-day week without major shutdowns or holidays was divided into scheduled ON-time and OFF time, then the ON-time was divided between (1) operation for test + development, (2) operation for experimenters, and (3) unscheduled troubles.

Year	½	1	2	4
Scheduled OFF (days) (Baltimore)	3	2	1	2/3
Scheduled ON (days)	4	5	6	6⅓
Tests	1	1½	1⅙	½
Physics	1	2¼	4⅓	5⅔
Trouble	2	1¼	½	⅙