SUMMARY OF OPERATIONS - APRIL 1978

Program Planning Office

During April the accelerator operated steadily, producing a high-intensity slow spill with the largest fraction used by two muon experiments collecting data in the Neutrino Area. This period represented the highest intensity operation ever with all slow spill; Main-Ring intensities at times exceeded 2×10^{13} protons per pulse. Furthermore this beam was obtained from rather reliable operation of the new H^- ion source and Booster injection system which were commissioned a month ago.

The completion of an experiment (E-552) in the Internal Target Area represented the end of experimental activities there until next year (see article on page 9). A single remaining experiment is tentatively scheduled to operate during January and February 1979.

Damping the enthusiasm over the steady high intensity operation of the Fermilab facilities has been the recent concern over increasing costs for electrical energy. With the coal strike this winter came the increased use of liquid petroleum for generation of electrical energy, and unfortunately with this there are substantially higher costs due to a steeply climbing fuel adjustment factor used in the power billing. As a consequence of this the cycle time of the accelerator at night and on weekends has been restricted to greater than 10 seconds, rather than about 8.6 seconds previously maintained. Rather than to increase the cycle time further, there is a plan to increase the amount of calendar time scheduled for shutdowns in the future.

FERMI NATIONAL ACCELERATOR LABORATORY
MONTHLY OPERATIONS HISTORY
APRIL 1978

Date		Accelerator	Int. Target Area	Proton Area	Neutrino Area	Meson Area
Sat.	4/1	Reprs: Booster	p-N Scattering 552	Photoprod.87A (PE)	Muon 203A/391 & Muon 448 (N1)	Multipart.110A (M6W)
Sun.	4/2	1.8×10^{13} ppp @400 GeV (1.25 sec flattop)		Di-Lepton 288 (PC)	Neutrino 310 Calib. (N5)	Multi-μ 439 (M2)
Mon.	4/3			P 519 Tests (PW)		Part.Search 490 (M1W)
Tue.	4/4	Reprs:2 magnets & Linac				Incl.K^0_s 383 (M4)
Wed.	4/5					
Thu.	4/6	Reprs:Linac & Main Ring				
Fri.	4/7	Reprs:200 MeV Line				Multi-μ 439 (M2)
Sat.	4/8					Part.Search 490 (M1W)
Sun.	4/9		OFF			Part.Search 469 (M6E)
Mon.	4/10	Tour & Repairs				Incl.K^0_s 383 (M4)
Tue.	4/11	Accelerator Studies				
Wed.	4/12		OFF	Photoprod.87A (PE) P 519 Tests (PW) OFF (PC)	Muon 203A/391 & Muon 448 (N1)	Multi-μ 439 (M2) Part.Search 469 (M6E) Incl.K^0_s 383 (M4) Had.Dissoc.272 (M1E)
Thu.	4/13	Reprs:MR magnet				
Fri.	4/14	1.9×10^{13} ppp @400 GeV		Photoprod.87A (PE) Di-Lepton 288 (PC) P 519 Tests (PW)	Yield Meas. (N3)	
Sat.	4/15					as above but Repairs (M2)
Sun.	4/16					
Mon.	4/17	Accelerator Studies				
Tue.	4/18	Accelerator and Experimental Area Maintenance & Development				
Wed.	4/19					
Thu.	4/20					
Fri.	4/21	Reprs.& Startup 1.7×10^{13} ppp @400 GeV (1.25 sec flattop)	OFF	Photoprod. 87A (PE) Di-Lepton 288 (PC) OFF (PW)	Muon 203A/391 & Muon 448 (N1) Yield Meas.(N3)	Multi-μ 439 (M2) Part.Search 469 (M6E) Incl.K^0_s 383 (M4) Had.Dissoc.272 (M1E)
Sat.	4/22					
Sun.	4/23					
Mon.	4/24	Reprs: Gnd.Fault				
Tue.	4/25					
Wed.	4/26	~~Power Factor Meas.~~				
Thu.	4/27	Reprs:Ion source				
Fri.	4/28				as above but ν356 Calib.(N5)	
Sat.	4/29					
Sun.	4/30					

BEAM UTILIZATION BY

	Beam	Hours
MESON AREA		
Particle Search #490	M1W	95
Multi-Muon #439	M2	240
Inclusive K_s^o #383	M4	350
Multiparticle #110A	M6W	60
Particle Search #469	M6E	275
Hadron Dissociation #272	M1E	155
Nuclear Chemistry #81	M0	-
NEUTRINO AREA		
Muon #203A/391	N1	405
Muon #448	N1	380
Neutrino #310 Calibration	N5	140
Neutrino #356 Calibration	N5	4
Yield Measurements	N3	220
Nuclear Fragments #466	N0	-
PROTON AREA		
Photoproduction #87A	PE	360
Di-Lepton #288	PC	315
P #519 Tests	PW	205
INTERNAL TARGET AREA		
p-N Scattering #552	C0	90
TOTAL HOURS FOR HIGH ENERGY PHYSICS		3294

EXPERIMENTAL ACTIVITY -- APRIL 1978

Activities

tuneup: including tests of a new high pressure streamer chamber

data: for study of high mass dimuon and multimuon spectra produced by 400-GeV proton interactions

data: for study of the reaction $K^- p \rightarrow K_s^o X$ at 200 and at 75 GeV

completed: study of the reaction $\pi^- p \rightarrow \pi^+ \pi^- n$ at 175 GeV

tuneup & data: including a search for heavy long-lived particles using Cherenkov and time-of-flight techniques

tuneup: for eventual study of coherent dissociation of π, K, p into strange particles

data: 5 targets exposed

data: including a search for heavy neutral leptons produced in muon interactions at 225 GeV

data: for study of muon interactions with nuclear targets at 225 GeV

calibration: of liquid and iron calorimeters using a hadron beam

tests: of new experimental apparatus using a hadron beam

tuneup & data: for measurements of π's and K's produced at various energies and angles by 400-GeV proton interactions with a BeO target

data: 3 targets exposed

data: including a search for charmed states produced in photon interactions

data: primarily for a high-resolution study of the dimuon spectra produced by 400-GeV protons

tests: of ability to collect data using a high-intensity proton beam

completed: pp and pd scattering studies using an internal proton beam

FACILITY UTILIZATION SUMMARY--APRIL 1978

I. Summary of Accelerator Operations

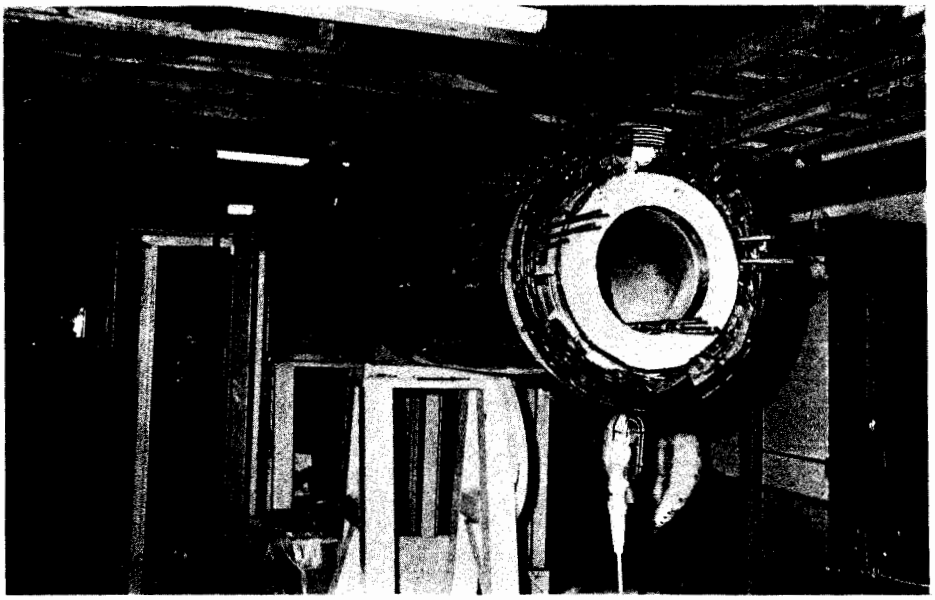
		Hours	
A.	Accelerator use for physics research		
	Accelerator physics research	29.2	
	High energy physics research	418.8	
	Subtotal		448.0
B.	Other activities		
	Accelerator setup and tuning to experimental areas	0.5	
	Program interruption	50.0	
	Unscheduled interruption	220.5	
	Subtotal		271.0
C.	Unmanned time		
	Total		719.0

II. Summaries of High Energy Physics Research Use

		# of Expts.	Hours	Results
A.	Counter experiments	13	2869	2 expts. complete
B.	Bubble chamber experiments	-	-	-
C.	Emulsion experiments	-	-	-
D.	Special target experiments	2	-	8 targets exposed
E.	Test experiments	1	205	P519 tests; completed
F.	Engineering studies and tests	(1)	220	Yield measurements (N3)
G.	Other beam use	-	-	-
	Totals	16	3294	

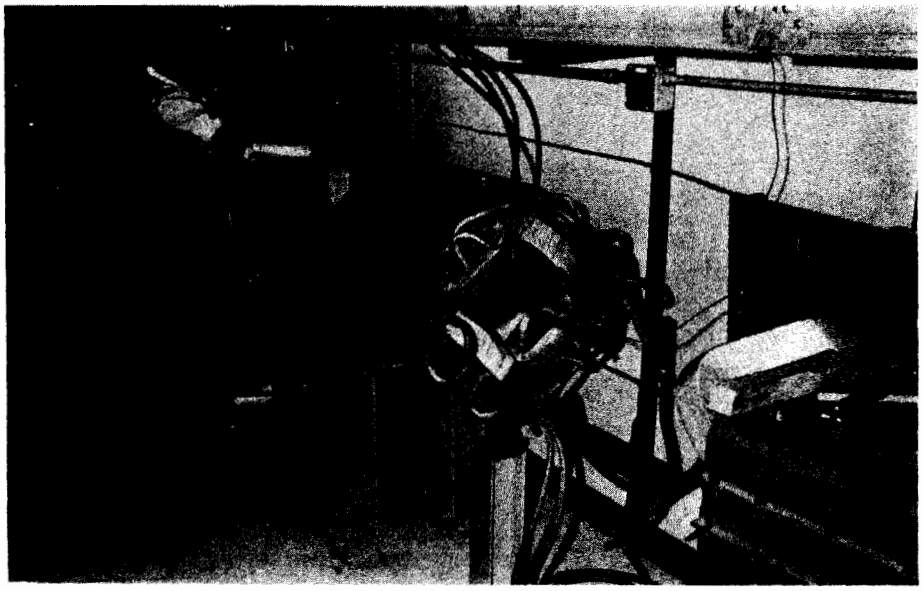
III. Number of Protons Accelerated and Delivered @ 400 GeV ($\times 10^{18}$)

A.	Beam accelerated in Main Ring	2.45
B.	Beam delivered to experimental areas	2.33
	Meson Area	0.30
	Neutrino Area	
	Slow Spill	1.90
	Fast Spill	0.00
	Proton Area	0.13



Ed Faught is sitting astride the electron-beam solenoid as it is being installed in the Cooling Ring.

(Photograph by Fermilab Photo Unit)



Shree Agrawal with his belly to the bench working on a Cooling Ring dipole. One of the early quadrupoles is installed in the foreground.
(Photograph by Fermilab Photo Unit)

PROPOSALS RECEIVED FROM FEBRUARY 1978 THROUGH MAY 9, 1978

No.	Title	Spokesperson
596	On Searching for Heavy Stable Particles	L. Lederman
597	Proposal for a High Statistics Study of $\bar{p}p$ Annihilations and a Comparison of $\bar{p}$, p, π^-, π^+, and K^+ Interactions on Hydrogen, Magnesium, and Gold at 100 GeV/c Utilizing the Fermilab 30-In. Hydrogen Bubble Chamber and Downstream Particle Identifier	J. Whitmore/ W. Shephard/ W. Walker
598	Proposal for a High-Statistics Study of $\bar{p}p$ and π^-p Interactions at 50 GeV with the Fermilab 30-In. Hydrogen Bubble Chamber Hybrid Spectrometer with Downstream Particle Identifiers	V. Barnes
599	A Prompt Neutrino Experiment at Fermilab	L. Mo
600	Proposal to Study Neutrino-Electron and Antineutrino-Electron Scattering	J. Cronin
601D	ARGONAUT - A Novel Detector for Very High Energy Neutrino Interactions	P. McIntyre
602D	A Proposal to Study the Interactions of Neutrinos and Antineutrinos at the Energy Doubler/Saver	A. Sessoms
603	A Search for the Production of Prompt Neutrinos in High Energy Proton Nucleus Collisions	D. Reeder
604	A Sensitive Search for Massive Neutral Long-Lived Particles	L. Jones
605	A Study of 15-20 GeV Massive Muon Pairs	C. Brown

DATES TO REMEMBER

June 2, 1978	Special Presentation Meeting for Hadron Jet Proposals.
June 17-23, 1978	Summer meeting of the Fermilab Physics Advisory Committee.
August 1-4, 1978	Photon Workshop at Fermilab (details next month).